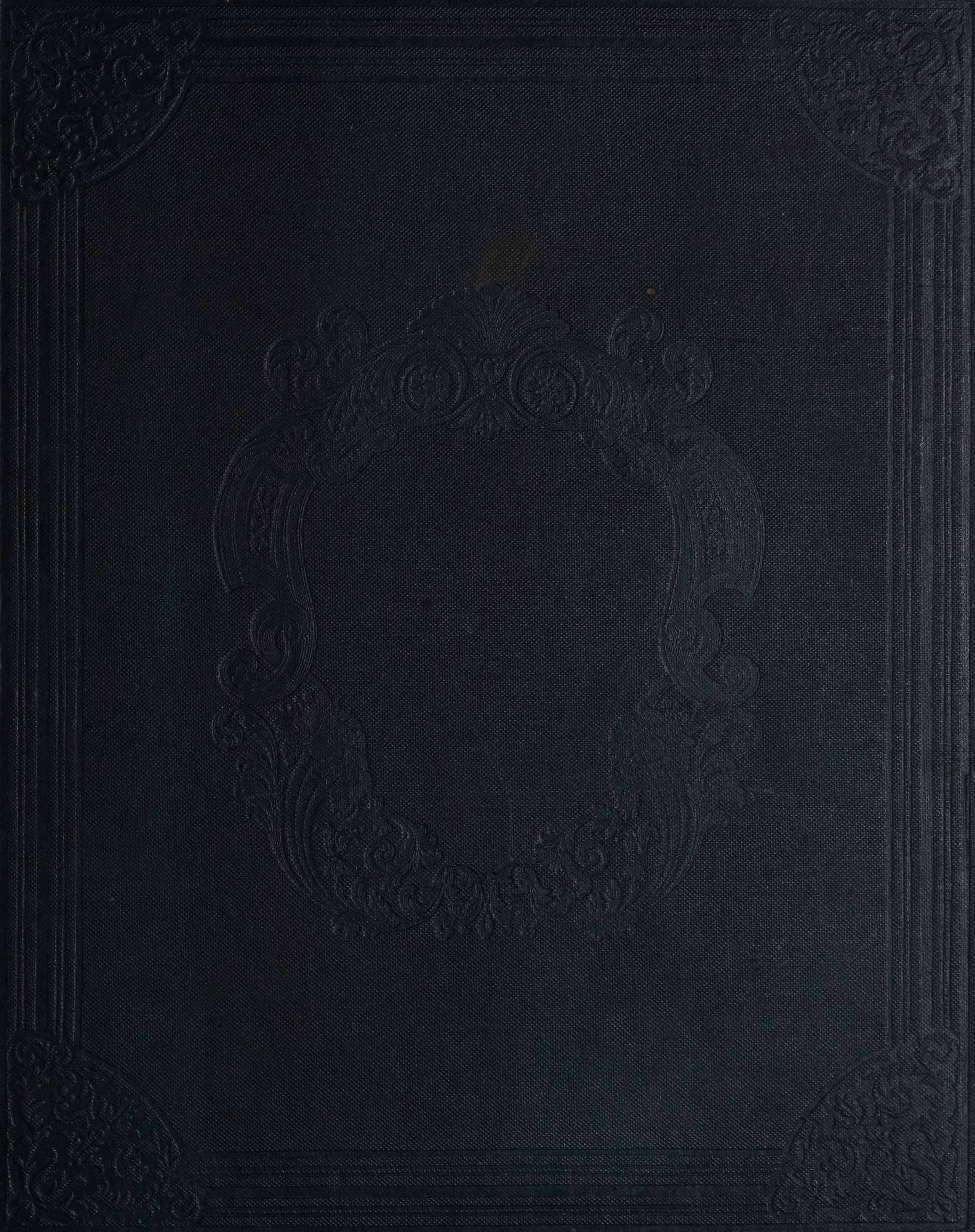

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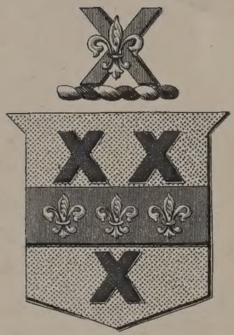

E. BARCLAY-SMITH, M.D.

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Alfred Haviland
Bridgwater Dec: 1845

OBSERVATIONS

ON THE STRUCTURE AND DISEASES

OF

THE TESTIS;

BY SIR ASTLEY COOPER, BART. F.R.S.
Serjeant Surgeon to the Queen, Consulting Surgeon to Guy's Hospital,
ETC. ETC. ETC.

SECOND EDITION.
EDITED BY BRANSBY B. COOPER, F.R.S.
SURGEON OF GUY'S HOSPITAL, LECTURER ON ANATOMY,
ETC. ETC. ETC.

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EDITOR'S PREFACE.

Since I commenced the pleasing task of presenting to the Profession a new edition of this valuable work, the grave has closed on its illustrious Author; and British Surgery has sustained a loss as irreparable, as it is severe. It might ill become one so nearly related to him as myself, to indulge in apostrophies in his praise; and would require language far beyond my power, to embody the feelings with which my heart swells in the recollection of him,—feelings too big for utterance, but which may probably be conceived by those who have drank of the cup of affliction, and been bereaved of a relative, a patron, and a friend.

Far be it from me to draw any invidious distinctions between the illustrious deceased, and the bright, and living ornaments of our profession; but I cannot wholly suppress the gratification, which seems even at this early period of my grief to assuage its violence, in contemplating the transcendent utility of Sir Astley Cooper's professional career, the unsullied brightness of his character through life, and the persevering industry which marked its close.

In the exercise of his calling he exhibited an acute penetration, a solid judgment, a benevolent care, great suavity of address, and a most tender anxiety for the comfort, relief, and recovery of his patients, to whatever rank of society they might belong. And whilst his exertions during life afforded extensive relief to suffering humanity, the liberal bequest of his contributions to science, will call down the gratitude of succeeding ages, and deservedly immortalize his name.

In sending forth to the world another edition of the late Sir Astley Cooper's valuable work on the Structure and Diseases of the Testis, which the Editor is enabled to do by the kind permission of the lamented Author, he feels that no apology is necessary. The high reputation which the work has now so long enjoyed, its practical utility, by no circumstance more strongly testified than by the extensive circulation which it has experienced both in this country and abroad; and the numerous inquiries for copies since it has been out of print, almost demand its republication. Under the impression, that it would be more agreeable to the public to be presented with the original observations of the Author as they were published by himself, the

Editor has forborne to mix the opinions of other writers, or to add any illustrations, which his own experience might otherwise have induced him to annex; and it reflects no inconsiderable merit on Sir Astley Cooper's industry and acuteness, that although a period of ten years has elapsed since the first appearance of the work, a period, too, in which there has been no lack of labour in the field of Anatomical and Surgical Science, no new facts of importance have been advanced on the subject.

The labour of the Editor has therefore, with some few exceptions, been limited to making the arrangement of the work somewhat more perfect, than that of the former Edition, the numerous and important avocations of the Author having prevented his bestowing that care on this part of the work, which he would otherwise have given to it. This task the Editor would not have presumed to have undertaken, had he not felt, that the very close association and intimacy which he enjoyed with Sir Astley Cooper, had made him thoroughly conversant with his views and real opinions. The severe illness of the Author prevented him from making some alterations and additions to the Plates, which he had contemplated, but some new matter has been added upon the subject of Varicocele.

PREFACE TO THE FIRST EDITION.

It was my original design to have immediately succeeded my First Part of the Illustrations of those Complaints of the Breast which are not malignant, by a Second Part, containing an account of its malignant diseases; but I have delayed the execution of that intention until I shall have satisfied myself upon some points which require further investigation.

In the meantime I present to the Public my Lectures on the Diseases of the Testicle, the greater part of which I have been in the habit of delivering for nearly forty years.

In order to render the subject more intelligible, I have prefixed an account of the Anatomy of this organ; having discovered a mode of injecting it, which enables it to be both more easily dissected and demonstrated, and its minuter structures more readily developed and preserved.

In describing the structure of the testis, I have intentionally excluded many commonly employed terms which tended not only to burden the memory without informing the understanding, but were also equally useless and inaccurate.

The Anatomical Preparations which compose my Plates, are in my own possession; and it will ever afford me pleasure to exhibit them, not only to my Countrymen, but to Foreigners, who may have a desire to gratify their curiosity by examining them.

The Morbid Preparations of which I have given Plates, I long since transferred to the Collection at St. Thomas's Hospital, with some few exceptions, which are mentioned in the explanations; and I lately visited the Museum with my friend Mr. Green, and had the pleasure of seeing them in excellent preservation.

I feel great regret at the price of this Work; but it arises from the number of its Plates. He who understands the expense of printing, of drawings, of engravings, and of colouring, will at once discover that my object in publishing, is not pecuniary advantage; but after having been for forty years placed in a situation of ample opportunity—after having been fostered by the Profession, and the Public infinitely beyond my deserts--I feel that I only perform my duty in giving to my medical brethren, without any sordid views, the result of my experience.

An outline of my Surgical Lectures has been already printed in various forms, and by different persons; but doctrines unaccompanied with illustrations, often convey imperfect and even false ideas of descriptions and opinions.

Those who wish to possess the Anatomical, without the Morbid Part of this Work, may be accommodated, by expressing the desire to the Bookseller.

PART I.

ON THE

ANATOMY OF THE TESTIS.

THE testes are contained within the scrotum, in which they are suspended at unequal heights, the left testis generally hanging lower than the right. Two advantages arise from this circumstance:—First, that when the thighs are approximated, they are not pressed against each other; but, one being received above the other, they are enabled to elude the violence which they would otherwise sustain. Secondly, this difference in their height permits the suspension of the penis to the left side, instead of its being placed directly forwards.

SCROTUM.

This part is composed of two portions of the common integuments united in the middle; and the place of their union forms a prominent line, which is called the raphe. This line, which begins at the frænum, descends under the penis to the scrotum, passes in the centre of the perinæum, and is lost at the anus. The skin of the scrotum is abundantly vascular, and secretes perspirable and sebaceous matter; and the sebaceous glands are chiefly placed in the line of the raphe.

The scrotum varies greatly in its appearance and size; for, under the influence of cold, it is small, contracted, and wrinkled; under heat, it is relaxed, smooth on its surface, and greatly extended.

The arteries which supply it with blood, are three in number on each side—viz. the external pudic; the perinæal artery of the internal pudic; and thirdly, an artery from the epigastric. The EXTERNAL PUDIC is the second branch of the femoral artery, springing from that vessel a little below Poupart's ligament, and beneath the origin of the external epigastric artery. The pudic divides into two branches:—the first passes to the upper part of the scrotum, and crosses the spermatic cord, at which part it sends branches to the fore-part of the scrotum, after which it supplies the skin of the penis and pubes; this artery is necessarily divided in the operation for castration and strangulated hernia. The second branch of the external pudic descends upon the side of the scrotum, and supplies its lateral portion with vessels.

The second artery of the scrotum is the PERINÆAL, it proceeds from the internal pudic artery; which latter vessel, after passing out of the pelvis, near the sciatic nerve, at the edge of the pyriformis, and at the lower part of the ischiatic notch, is continued to the inner side of the tuberosity and ramus of the ischium; and having given off its external hemorrhoidal artery to the anus, it sends its perinæal branch forwards between the bulb and crus penis. The perinæal artery passes upon the septum scroti, supplying it with blood-vessels, and is continued forwards to the raphe, where it anastamoses with the external pudic. In its course it sends vessels to the accelerator urinæ and transversus perinæi muscles. The SCROTAL branch from the epigastric artery descends soon after the origin of that vessel. It first sends a branch down upon the spermatic cord, which is distributed to the cremaster muscle; and then a larger branch descends upon the side of the symphisis pubis to the skin, and fat of the pubes; it next anastamoses with the external pudic artery, and descends to the inner and upper part of the thigh, and to the back part of the scrotum, anastamosing there with the perinæal and external pudic arteries.

The veins of the scrotum return their blood by the side of their corresponding arteries: the external pudic vein passes into the femoral vein at the groin, the perinæal vein into the internal pudic, and the veins at the back of the scrotum into the epigastric vein. The skin of the scrotum is so thin, that the veins may be seen through it.

The absorbent vessels of the scrotum are large and numerous: they pass into the glands of the groin below Poupart's ligament; so that when the scrotum is diseased, the irritation is extended to the inguinal glands.

The nerves of the scrotum are derived from three sources.

1st. The *Lumbo scrotal* or *Inguino scrotal* nerve. It arises from the first lumbar nerve, and passes out from beneath the external edge of the psoas magnus muscle lying on the quadratus lumborum, then taking the course of the crest of the ilium and reaching the anterior third of that bone it pierces the transversalis abdominis muscle, and lies between it and the internal oblique, distributing filaments to each of those muscles and to the skin at the outer part of the groin; it then runs along the edge of Poupart's ligament as far as the abdominal ring, through the superior pillar of which it most frequently passes, and is lost in supplying the skin of the scrotum, pubes, and external part of the groin.

2ndly. The *External Spermatic* or *Genito Crural Nerve.* It arises from the first and second lumbar nerves, descends for some distance in the substance of the psoas muscle, and then passes on its anterior surface to the crural arch, where it divides into two branches; the external follows the course of the femoral vessels, and ramifies on the skin of the upper and inner part of the thigh; the internal passes through the external abdominal ring, and is distributed to the cremaster muscle and dartos.

3rdly. The internal pudic nerve from its inferior or perineal branch also sends filaments to the scrotum; this branch takes its course forwards along the inner side of the tuberosity of the ischium, sending filaments to the levator and sphincter ani muscles, and skin and fat about the anus, proceeds forwards and upwards along the perineum, between the erector penis and accelerator urinæ muscles, sending branches to them, and numerous filaments to the mucus membrane of the bulb of the urethra, and is ultimately lost by supplying the scrotum. The filaments of this inferior branch of the internal pudic unite with perineal branches from the inferior gluteal nerve.

DARTOS.

On the inner side of the integuments of the scrotum a muscle is supposed to exist, which is called the dartos, and to which the motions of this part have been attributed; but it exists merely in the imagination of the Anatomist: for it is clear that the motions of the scrotum are not the result of muscular action; they are vermicular, gradual, and not sudden contractions; they are not voluntary; they are not obedient to the mind; but they result from changes of temperature, and therefore seem to depend upon the lessened diameters of the arteries and veins of the part, and of the diminished quantity of blood which they contain.

This structure termed the dartos is in fact nothing more than the superficial fascia of the scrotum strengthened by some tendinous fibres from the external abdominal ring, which have been termed by some Anatomists the fascia spermatica externa.

CELLULAR TISSUE OF THE SCROTUM.

Within the scrotum a long loose reticular membrane is found, which proceeds from the inner side of the integuments to the external covering of the spermatic cord and testis. Nature has formed it rather reticular than adipose, to prevent any increase of bulk under corpulency. It is long and loose, to permit of great freedom of motion in the testes, and to enable them to elude the influence of violence.

Opposite to the raphe it is more condensed than at any other part, and it is there named the septum scroti, although it is not truly a septum, for it is permeable to air and water; and when the scrotum is œdematous, the dropsical effusion passes through the septum, so that the whole of the reticular membrane is distended.

From the septum scroti, reticular fibres pass to the coverings of the testis, to preserve each testis in its situation.

The septum scroti is supplied with blood from the perinæal artery, and that vessel anastamoses freely with the external pudic. When the testis, in a diseased state, adheres to the septum, these vessels become greatly enlarged, and often furnish, during its extirpation, a troublesome hemorrhage, if each divided vessel be not secured in a ligature.

SUPERFICIAL FASCIA OF THE CORD, OR FASCIA SPERMATICA EXTERNA.

When the scrotum, and the cellular tissue with which it is lined, are removed, the spermatic cord appears covered with this fascia, which also descends to the testicle. It first proceeds from the surface of the tendon of the external oblique muscle of the abdomen, which it covers, and it is joined to the edges of the external abdominal ring, and from thence descends upon the spermatic cord to the lower part of the testis. It is internally attached to the cremaster muscle and its tendon; externally to the cellular tissue of the scrotum. It forms a purse to support the testicle when the scrotum is relaxed; it attaches the testicle to the scrotum by sending to it a reticular membrane, and it envelopes and connects the superficial vessels and nerves with the spermatic cord.

CREMASTER MUSCLE.

This muscle next appears in the course of the dissection, enveloping the spermatic cord, covering it entirely, and becoming inserted into the tunica vaginalis; but as the cremaster belongs to the cord as well as to the testis, I will proceed with the dissection of the testis, and afterwards describe the cremaster.

DEEP FASCIA OF THE CORD, OR FASCIA SPERMATICA INTERNA.

Under the cremaster is found a fascia between it and the tunica vaginalis reflexa, which proceeds from the internal abdominal ring, and is in fact a continuation of the fascia transversalis, so that the cremaster muscle is placed between two layers of fascia.

TUNICA VAGINALIS.

This membrane, when first raised, is found to be covered entirely by the tendon of the cremaster muscle, which envelopes its outer surface, and is inserted into it; and until this be cut through, the true tunica vaginalis does not appear. The fascia spermatica interna is lost in cellular membrane before it reaches this tunic, and therefore cannot be said to give a covering to it.

When the insertion of the cremaster muscle is cut away, the tunica vaginalis is found to be a very delicate and thin membrane, formed by a prolongation of the peritonæum, and descending from the abdomen before the testis. It is composed of two portions: the one loose, and detached from the testis, except posteriorly and laterally; the other, which adheres to the surface of the tunica albuginea, and which covered the testis whilst in the abdomen; but when examined in the scrotum, the two portions are connected, and are continuations of each other.

The first or loose portion, is the tunica vaginalis reflexa, and the adhering portion, the tunica vaginalis testis: between the two there is a cavity, into which a vapour, or halitus, is naturally secreted, and which, when poured out in a diseased quantity, produces the complaint which is called hydrocele.

The tunica vaginalis is a reflected serous membrane, like the pericardium, pleura, and peritonæum; from the latter of which it is derived, by the descent of the testicle from the abdomen. It forms, like all other serous membranes, a shut sac, suspending and covering the testicle and epididymis closely, excepting at a small space at the posterior part of the gland where the vessels enter into the organ; this close portion of the membrane is termed the tunica vaginalis testis, and from it a loose portion is reflected from the posterior part of the testicle to line the scrotum, forming the tunica vaginalis reflexa; so that both the testicle and epididymis are behind this serous membrane, nothing being contained within the cavity but its secretion, which lubricates its surface, and facilitates the motion of the parts.

The tunica vaginalis testis can be dissected from the tunica albuginea but to a short distance, as it soon becomes incorporated with the surface of that membrane.

Behind the tunica vaginalis reflexa, and the tunica vaginalis testis, the testicle is placed, contained in its tunica albuginea; and the spermatic vessels, the vas deferens, the absorbents, and the nerves of the testicle enter it posteriorly, and do not penetrate the tunica vaginalis; so that the testis may be cut into behind, without injury to that tunic.

In this dissection, then, the scrotum is first cut through; next the cellular tissue; thirdly, the fascia superficialis, or fascia spermatica externa; fourthly, the cremaster muscle; fifthly, fascia spermatica interna; sixthly, the tunica vaginalis reflexa; seventhly, the tunica vaginalis testis; and then the testis, with its covering the tunica albuginea, is exposed.

The tunica vaginalis is a serous membrane, and forms a cavity, which communicates with the peritonæum, and cavity of the abdomen before birth, but is usually shut after birth by adhesion, when it becomes a small thin cord, situated on the forepart of the spermatic vessels. The fluid which it secretes, when abundant, has the colour and other properties of serum, being a solution of albumen. It is coagulable by heat, and various chemical agents. The tunica vaginalis is supplied with vessels from the spermatic artery, and artery of the vas deferens, from which its halitus is secreted. Its veins open into the spermatic veins. Its absorbents pass upon the spermatic cord with those of the testis, and with them into the abdomen; and its nerves are in part derived from the spermatic plexus, and in part from a branch of the external spermatic. It possesses considerable sensibility, and irritation of it produces sickness. In the healthy state, when opened, no fluid is found in it; but a vapour arises, and it becomes dry.

When the tunica vaginalis reflexa is opened, the cavity which is situated between it and the tunica vaginalis testis is exposed; and through the latter membrane, which is semi-transparent, the tunica albuginea testis appears. The general form of the testis and epididymis may then be observed, the latter being placed upon the upper, posterior, and outer part of the testis; beside which a little vascular membranous body is also seen upon the anterior extremity of the caput epididymis.

OF THE TESTIS.

This organ is oviform, and its largest extremity is placed upwards and forwards. It is situated obliquely, being neither horizontal nor perpendicular, but in the diagonal of the two.

It is divided into an anterior and superior, a posterior and inferior extremity; into an anterior and inferior, a posterior and superior edge; and into its two lateral surfaces. Its anterior edge is most rounded; the posterior least so; the two sides are convex, although flatter than the anterior edge. At the posterior edge the spermatic vessels enter, and this part is devoid of the tunica vaginalis. The upper extremity of the testis is capped by the epididymis.

The axes of the testis are three: the vertical one is the longest, being two inches in a healthy, well-formed testis, and it passes from the anterior and upper extremity, to the posterior and lower. The second or antero-posterior axis is one inch and a half, and it passes from the posterior superior, to the anterior and inferior edge; whilst the third or transverse diameter, passing from side to side, is one inch and one-eighth in length. The weight of a healthy testis and epididymis is about an ounce.

OF THE TUNICA ALBUGINEA TESTIS.

This strong fibrous membrane forms a complete covering to the glandular structure of the testis, leaving a cavity in which that organ is contained; but at the upper and posterior part of the testis, a little to its outer side, the tunica albuginea splits into two layers, the inner of which turns into the centre of the testis and forms a triangular process, while the outer passes upwards upon the spermatic cord. The space included between these two layers I shall term the mediastinum testis, instead of the old name corpus Highmorianum, vide plate II. fig. 8.

This inverted portion of the tunica albuginea sends forth numerous ligamentous cords. Some of these cords pass directly from the mediastinum to the anterior edge of the testis, and form pillars, which are strongly fixed to the inner side of the tunica albuginea, to prevent the separation of its sides; others, and the greater number, but smaller cords, descending upon the seminiferous tubes, send forth lateral membranes, which form purses, to enclose the lobes into which the glandular structure is divided; and these are met by similar ligamentous cords and membranes from the inner surface of the tunica albuginea, to complete the envelope of the lobes of the testis.

The tunica albuginea, therefore, is not merely a simple bag to enclose the glandular structure of the testis, but it forms a process which splits into ligamentous cords; and these send forth lateral membranes, which divide the glandular structure into lobes, in which the seminal tubes are contained.

The membranes and cords not only support and connect the seminal tubes, but they form beds, upon which arteries, veins, absorbent vessels, and nerves are spread. They have been called septa; but they really envelope the seminiferous tubes, convey to them the blood vessels, and form bags, which support, confine, protect, and nourish the tubular structure of the testis.

The outer surface of the tunica albuginea is covered by the tunica vaginalis testis, and this is formed of the peritonæum, which covered the testis whilst still in the abdomen. It is very thin, and is soon incorporated with the surface of the tunica albuginea, from which it can be separated only to a small extent; but as it is a serous membrane, it renders the outer part of the tunica albuginea a secreting surface.

The tunica albuginea and its processes are by dissection further divisible into two layers or portions. The outer tunic is fibrous, tendinous, and inelastic, resembling the sclerotic coat of the eye, and external portion of the dura mater; and, like other tendinous structures, it is endowed with but little vascularity. It is strong and inelastic, to protect the tender tubular substance of the testis from violence; for the most severe blow or pressure rarely injures it whilst suspended in its natural situation: and although extravasations of blood into the tunica vaginalis are not uncommon, yet the testis generally escapes any severe injury; as blows inflicted upon the eye, produce great ecchymosis in its neighbourhood, yet how rarely is the eye itself ruptured!

The inner coat or layer of the tunica albuginea I should call the tunica vasculosa; for on it the spermatic artery ramifies. It is easily separated by dissection from the outer layer, excepting at the anterior edge of the testis, where some of the internal ligamentous cords are fixed; but it may be entirely separated from the outer layer of the tunica albuginea, so as to form a separate preparation, enclosing the tubuli, and leaving the outer layer of the tunic with the spermatic cord. This tunica vasculosa is easily demonstrated, by filling the arteries and veins with fine injection: and if the testis be then cut open, and the tubuli removed, this membrane is seen highly vascular on the inner part of the tunica albuginea.

Whilst the outer layer bears a strong resemblance to the dura mater, like it being tendinous and inelastic, and forming processes internally; the inner membrane of the tunica albuginea resembles the pia mater, being reflected inwards on the lobes of the testis, and forming a bed, on which the branches of the spermatic artery ramify, and supplying with vessels the membranes which envelope the tubuli.

The arteries which supply the tunica vasculosa, pass between this coat and the proper tunica albuginea before they divide into minute branches, to supply the membrane which is reflected inwards. Some branches of the spermatic veins also ramify upon the surface of this membrane; but the greater number pass, upon the ligamentous cords, into the glandular substance of the interior of the testis; and upon this membrane absorbent vessels are also found.

OF THE LOBES OF THE TESTIS.

The tubuli seminiferi are disposed in numerous lobes, which are contained in the tunica albuginea. These lobes are pyriform: their stalk, or commencement, is turned towards the mediastinum to the upper and posterior edge of the testis, and their bases to the anterior and lateral parts of the tunica albuginea. These lobes receive suspensory cords or ligaments from the mediastinum testis, which send out membranes, to be spread over the lobes, and which meet others springing from the anterior edge and sides of the testis (see Plate II.); thus the lobes are suspended in the ligaments and membranes, and by them confined in their situation, so as to be incapable of being displaced: for if the tubes had been merely loosely suspended within the tunica albuginea, they would have been continually liable to derangement from concussion, and to be torn asunder by violence.

OF THE TUBULI SEMINIFERI.

The cavity formed by the tunica albuginea is in a great measure filled by the tubuli seminiferi, which, as I have stated, do not hang loosely within it, but are divided into two sets of lobes: first, into large lobes, which are enveloped in membranes, and connected with the larger ligaments or pillars of the testis; and, secondly, into an infinite number of small lobes, each also contained within a membrane. The larger lobes are composed of numerous tubuli clustered together; the smaller are formed of a single tubulus, and sometimes of two tubuli. The larger lobes are pyriform, their stalks attached to the rete, their bases to the inner side of the tunica albuginea. They are situated between the stronger pillars of the ligaments of the testis, as they pass from the mediastinum to the inner part of the tunica albuginea; and the vascular membranes by which they are enveloped, pass from one ligament to the other; the smaller lobes are also disposed in vascular membranes, and supported by smaller ligaments and vessels.

Each tubulus begins from the tunica vasculosa, immediately forms an excessively convoluted pyriform body, the base of which is directed forwards towards the tunica albuginea, while its apex is directed backwards, passes through a small opening in the mediastinum and terminates in one of the canals of the rete testis. Thus the course of the tubuli are at nearly right angles with the long axis of the testicle. Each tubulus may be unravelled, when it is found to be composed of a long, single, and convoluted vessel, the convolutions being disposed nearly in parallel lines.

With these tubuli formed into larger and smaller lobes, and supported by ligaments from the mediastinum, is the cavity of the tunica albuginea filled. The blood vessels distributed upon the lobes are as follows:—First, the SPERMATIC ARTERY passes in two large branches on the opposite side of the testis to the epididymis; and between the outer and inner layer of the tunica albuginea they are continued upon the inner coat towards the anterior and inferior edge of the testis. There they form an arch of communication, from which vessels pass upwards and backwards upon the membranes which cover the lobes of the tubuli; and when they have reached two-thirds of the way to the mediastinum, they divide into two branches, which turn back on each side towards the anterior edge, and supply the membrane abundantly with vessels. The smaller lobes receive a little vessel at each extremity.

The principal branches of the *spermatic veins* pass from the testicle in a different manner to which the arteries enter the organ. The spermatic plexus of veins commences from the tunica vasculosa, pass along the ligaments of the testis between the larger lobes of the tubuli seminiferi, ramify in the mediastinum, and perforate the tunica albuginea at the upper and back part of the testicle, there receiving a large branch or two from the epididymis; they then form a plexus of four or five branches, surround the vas deferens, pass upwards behind the tunica vaginalis of the chord, frequently anastomosing with each other and with the veins of the scrotum and penis, and pass into the abdomen through the inguinal canal.

OF THE RETE.

By the term Rete is meant a congeries of canals which receive the semen from the tubuli; and it is to be distinctly understood that these canals are not placed in the general cavity of the tunica albuginea, as the tubuli are, but that they are situated between the layers of the tunica albuginea itself, in the space which I have called the mediastinum. This space is placed at the posterior edge of the testis, but a little inclined to its outer side; and it is situated opposite to the epididymis.

To dissect this structure clearly and distinctly, first make a transverse section of the testis, and then, looking at its divided edge, it will be seen that the tunica albuginea is at that part readily divisible into three layers. The first layer turns upon the spermatic cord, uniting with the sheath which covers its vessels. The second layer unites with a similar layer on the opposite side, and forms a thick substance, between the fibres of which, interstices are left for blood-vessels and absorbents; whilst the internal layer, uniting with that on the opposite side, as well as with the preceding layer of the tunica albuginea, forms the process which I have called mediastinum, which projects into the testis between the tubuli; and it is in this substance that the seminal canals of the rete are placed. (Vide plate II. fig. 8.) The mediastinum is therefore composed of two bodies—the upper placed towards the spermatic cord, the lower towards the centre of the testis:—in the upper are situated blood-vessels; in the lower, the canals of the rete; and from the lower proceed the pillars which are stretched to the inner side of the tunica albuginea, to bind its sides together, and smaller ligaments are also sent to the lobes of the tubuli, to envelope and support them.

If an incision be made in the long axis of the testis, from one extremity to the other, the mediastinum will be seen projecting downwards and forwards amidst the tubuli, reaching more than three-fourths the length of the testis, and its edge terminates in forming its ligaments. In a testis which measured an inch and three-quarters, the mediastinum was an inch and an eighth in length.

In the whole length of the mediastinum, canals are passing which enclose the rete; and when a transverse section is made of the mediastinum, these canals are very visible to the naked eye: they pass in a longitudinal and waved direction from the posterior to the anterior part of the mediastinum, and are situated in it more to the anterior and lower, than to the posterior edge of the testis. And hence I have observed that the mediastinum answers the double purpose posteriorly of containing the blood-vessels, and anteriorly the seminal tubes, which form the rete.

In these mediastinal canals the tubuli seminiferi terminate by single vessels, which pass through small apertures between the ligaments of the mediastinum, and they enter the anterior edge, as well as into the sides and extremities to form the tubuli of the rete; but at the posterior edge of the mediastinum they do not enter. The rete terminates at the upper and posterior extremity of the testis by forming the vasa efferentia. The mediastinum descends towards the centre of the testis, and the central tubuli there enter it, whilst the others pass into its sides. The back part of the mediastinum has a very convoluted artery passing from one extremity to the other. The veins also ramify upon the back of the mediastinum, and receive vessels through it, which have passed between the ligaments and lobes of the tubuli.

Having traced the tubuli of the rete, and found that they were situated in, and completely enclosed in the tunica albuginea, it struck me that I might inject these tubes with glue, or even coarse injection, by passing a fine silver or steel pipe into the canals of the rete; and having made trial of this plan, I have injected the tubuli seminiferi with coloured fine injection, and the vasa efferentia were also readily filled, and have been thus able to make some beautiful preparations, more easily dissected, and much less easily spoiled, than those which are made by injecting the tubes with quicksilver. The rete can even be filled with coarse injection; and the beginnings of the tubuli and the vasa efferentia will receive the injection. If the injecting pipe be placed in the back of the mediastinum, the injection readily escapes into the absorbent vessels, and those of the spermatic cord become filled. (Vide plate IV.)

OF THE VASA EFFERENTIA.

The tubuli seminiferi contained within the greater cavity of the tunica albuginea, and the tubuli retis in the smaller cavity, or mediastinum, together constitute the excretory apparatus of the body of the testicle, while the continuation of the seminal vessels from the rete to the epididymis constitute the vasa efferentia, which are therefore the medium of communication of the testis and its appendix. The vasa efferentia proceed from the anterior and upper extremity of the rete, and pass to the epididymis, in which they terminate. The greatest number of these vessels which I have seen is fifteen, and from thirteen to fifteen exist in a healthy testis; but they are very often found in a diseased state, and obliterated so as to be reduced to the number of six or seven; but this does not prevent the organ from continuing to perform its functions, as the semen is still readily conveyed by the remaining channels into the epididymis. The vasa efferentia arise singly from the rete, and they terminate in the epididymis, in different parts of it, but unite, so as to leave the epididymis as a single tube. Immediately before the termination of the vasa efferentia into the epididymis they each form a conical body, in which the seminal tube is divided with extreme minuteness, and a small band of communication is continued along their surface from the mediastinum to the epididymis. Between the vasa efferentia and the conical lobes which they form, strong ligamentous cords are found, intended for the purpose of strengthening the connexion between the testis and epididymis; and the tunica vaginalis which is reflected over them, is here stronger than in other parts. The vasa efferentia have the general form and character of the tubuli testis, only that their direction is altered. The first vas efferens has the readiest communication with the epididymis, the second a smaller, and so on, although they all ultimately communicate with it.

OF THE EPIDIDYMIS.

This body may be considered as an appendix to the testis, and its name is derived from its being placed upon this organ, as the testis were anciently called didymi.

It is of a crescentic form; its upper edge is rounded, its lower edge is thin. Its anterior and upper extremity is called its caput, the middle part its body, and the lower part its cauda. The caput and cauda have been called globus major and minor; but there is no enlargement entitled to the name of globus minor. The epididymis is covered by the tunica vaginalis reflexa. The tunica vaginalis testis is continued from the side of the testis towards the epididymis, and passes directly over its caput and cauda; but in the centre it passes under the body of the epididymis to the spermatic cord; then turns, and lines the inner side of the epididymis, and rises over its sharp edge, to cover the upper part of its body, being continued, to form the tunica vaginalis reflexa. The cauda it covers superficially. The caput it closely invests.

Thus each extremity of the epididymis is confined to the testis; but at its centre there is a hollow between the two, into which the point of the finger may be passed, and which is lined by the tunica vaginalis.

When the tunica vaginalis is raised from the epididymis, numerous cords, and branches of blood-vessels, may be observed passing into it from the posterior to the anterior extremity, dividing it into lobes; and these cords are the insertions of the cremaster muscle into the epididymis. They also form bands, which prevent the convolutions of the tubes from being displaced.

OF THE CAPUT EPIDIDYMIS, OR GLOBUS MAJOR.

The part so called is principally formed of the lobes of the vasa efferentia, named by some Anatomists the Coni Vasculosi, and these are not situated in a single line, but are placed behind each other; so that the end of the epididymis is curved, and lobulated.

Between these lobes are found tendinous cords, which separate and support them; and to the upper part of the vasa efferentia a band of epididymis passes, which receives a duct from each lobe of the vasa efferentia.

OF THE CAUDA EPIDIDYMIS.

The cauda terminates in the vas deferens, the tube of which, is larger and less convoluted than that of the rest of the epididymis; and this is its chief distinction. But in injecting the testicle, the quicksilver is with difficulty made to pass from the vas deferens into the epididymis, in consequence of the sudden turn the tube here makes, and from its being bound down by tendinous cords proceeding from the cremaster muscle.

OF THE BODY OF THE EPIDIDYMIS.

The body of the epididymis is entirely composed of the convolutions of a single seminal tube, formed by the union of the vasa efferentia, and these convolutions are converted into distinct lobes by septa of the tunica albuginea, which pass in parallel lines from one edge to the other.

That the epididymis is composed of a single tube, is not only shown by its being capable of being entirely unravelled after maceration; but to the learner it is easily demonstrated by unravelling it at any one part.

It is, however, subject to some varieties. First, I have seen it naturally unravelled in its centre, to the extent of three-quarters of an inch; and, secondly, it very frequently sends forth an additional vas deferens, from one to three inches in length, along the spermatic cord; and I have a preparation of three of these in the same testicle, each terminating in a blind extremity.

The arteries and veins of this part I have already described; and the absorbents of the epididymis pass into those of the spermatic cord, about an inch from the convex edge of its upper border.

OF THE VAS DEFERENS, OR DUCTUS SPERMATICUS.

This duct begins from the cauda epididymis, and it terminates in the duct of the vesicula seminalis, the combined vessels opening at the veru montanum, in the prostatic portion of the urethra.

At its beginning from the epididymis it is doubled upon that body, and bound down by the tendinous fibres and insertions of the cremaster. It is at its commencement very much convoluted, though less so than the epididymis; and it does not form any distinct lobes. It descends below the cauda of the epididymis at its commencement, and for the first inch its convolutions are numerous; in the second inch of its ascent, they become less in number; and in the third inch, in a great degree disappear. It then ascends to the external ring, passes along the inguinal canal, and at the internal ring enters the cavity of the abdomen.

It then quits the spermatic artery and vein, crosses the edge of the psoas muscle, and descends into the pelvis—first, by the side of the bladder; and, secondly, behind it, and between the vesiculæ seminales enters the prostate gland.

The vas deferens is enclosed in a sheath, formed by the tendinous fibres of the cremaster, and is supported by ligaments of its own which descend from the internal ring; which sheath may be readily found in the first three inches of the tube from the epididymis. The ligaments are intended to strengthen the connexion of the testis to the body, to support the testis, and to preserve the convolutions of the vas deferens, for which its two lateral bands are particularly designed.

The vas deferens is situated posteriorly in the spermatic cord; and there is a space of a quarter to half an inch between it, and the spermatic artery and vein.

It is round and hard, and is thus easily distinguished from the other vessels.

It is distinctly muscular in the bull, and its fibres take a circular direction, as may be readily seen in that animal, by examining the enlarged part of the vas deferens, which is situated behind the bladder.

Where these vessels are placed between the vesiculæ seminales, they become enlarged, and their internal surfaces cellular, secreting a fluid which mixes with the semen.

The structure of the vas deferens, near its termination, bears a strong resemblance to that of the vesiculæ seminales.

OF THE SPERMATIC CORD.

The parts which compose this cord are situated in the abdomen, although not there formed into a distinct cord; they become so in the inguinal canal, and between the abdominal ring and testicle.

It consists of three arteries with their corresponding veins, of the vas deferens, of absorbents, and of nerves covered by the cremaster muscle, fascia, and serous membrane.

OF THE PARTS IN THE ABDOMEN.

The spermatic arteries take their origin from the anterior and lateral part of the aorta, between the superior, and inferior mesenteric vessels; but much nearer the former than the latter, and a little below the renal arteries.

But their origin is liable to great varieties. Sometimes one or other springs from the renal artery, sometimes both from the superior mesenteric artery at its root; and although they generally arise opposite to each other, yet in this respect they sometimes vary.

They descend from their origin behind the peritoneum, to the fore-part of the psoas muscles.

On the right side the artery passes anteriorly to the inferior cava, and on each side before the ureters. They diverge as they descend, passing to the lower part of the abdomen, to midway between the anterior and superior spinous process of the ilium and the symphisis pubis, and from a quarter to half an inch upon the outer side of the epigastric, and in front of the external iliac artery.

In its course in the abdomen it is serpentine; as it descends, it gives off small branches to the cellular covering of the lower part of the kidney, to the ureters, and to the peritoneum.

The spermatic arteries next enter the inguinal canal through the internal ring, and descend obliquely towards the external; from whence they emerge, and appear in the spermatic cord surrounded and enveloped, by the spermatic veins.

When the artery reaches from one to three inches from the epididymis, varying in different subjects, it divides into two branches, which descend to the testicle on its inner side, opposite to that on which the epididymis is placed; one passing on the anterior and upper, the other to the posterior and lower part of the testis.

From the anterior branch the vessels of the epididymis arise: First, one passes to its caput; secondly, another to its body; and, thirdly, one to its cauda and the first convolutions of the vas deferens, communicating freely with the deferential artery, from the hypogastric.

The spermatic artery, after giving off branches to the epididymis, enters the testis, by penetrating the outer layer of the tunica albuginea; and dividing upon its vascular layer, they form an arch by their junction at the lower part of the testis, from which numerous vessels pass upwards; and then descending, they supply the lobes of the tubuli seminiferi.

Beside this lower arch, there is another passing in the direction of the rete, extremely convoluted in its course, and forming an anastomosis between the principal branches. (Vide Plate III.)

OF THE SPERMATIC VEINS.

There are two veins at their terminations in the abdomen; for they may be said to begin at the extremities of the arteries on the tunica vasculosa testis, and to terminate in the abdomen. On the right side, the spermatic vein ends in the inferior cava, nearly opposite to the origin of the spermatic artery; and on the left side, in the renal or emulgent vein.

They enter the abdomen at the internal ring, and pass in contact with the arteries, near to the kidneys, before they quit them to terminate in the manner which I have stated.

Two or three veins often accompany each spermatic artery in the abdomen; and branches also cross upon the coats of the artery, and form several anastomoses; but they unite into one before they terminate.

In the inguinal canal they are placed with the spermatic artery; but are divided into two, three, or more vessels, beside some small communicating branches.

When examined below the external ring, they will be found as follow:

Three sets spring from the testis, one from the rete and tubuli, another from the vascular layer of the tunica albuginea, and a third from the lower extremity of the vas deferens.

The veins of the testis pass in three courses into the beginning of the spermatic cord; two of these quit the back of the testis; one at its anterior and upper part, and a second at its centre; and these, after passing from two to three inches, become united into one. The other column accompanies the vas deferens. There is also a large vein just above the testis, which crosses to join the three columns. (Vide Plate III. fig. 6.)

The veins of the epididymis are, one from the caput, another from its body, one from its cauda, and another from its junction with the vas deferens, beside some small branches; they terminate in the veins of the spermatic cord.

The veins of the cord below the external ring divide into numerous branches, which are not only turned and twisted upon each other, but very frequently communicate; so that, although they have valves, like other veins, they may be injected contrary to the course of the blood, by the injection traversing from one to the other. These vessels have been absurdly called the vasa pampyniformia.

When we consider the length of the spermatic arteries and veins, and the numerous convolutions which they make, and remembering that they are living tubes, whose directions are constantly changing, it must be obvious that nature has designed to make the circulation slow, the secretion elaborate, and that she has defended the tender structure of the testis from the danger of an impetuous current.

This tardiness of circulation is further secured by the number and great size of the spermatic veins, when compared with their accompanying arteries.

There is a SECOND ARTERY in the spermatic cord which accompanies the vas deferens; it arises from one of the vesical arteries, a branch of the hypogastric, near the remains of the umbilical artery, from whence several vesical branches spring. (Vide Plates III. and VI.)

This DEFERENTIAL artery divides into two sets of branches, one set descending to the vesicula seminalis, and to the termination of the vas deferens; the other, ascending upon the vas deferens, runs in a serpentine direction upon the coat of that vessel, passing through the whole length of the spermatic cord; and when it reaches the cauda epididymis, it divides into two sets of branches; one advancing, to unite with the spermatic artery, to supply the testicle and epididymis, the other passing backwards to the tunica vaginalis and cremaster.

THE ABSORBENT VESSELS OF THE TESTICLE.

These vessels arise both from the coats of the testicle and from its internal structure. They unite upon the cord, and form three or four trunks, which ascend upon the spermatic veins; they pass through the inguinal canal, and when they enter the cavity of the abdomen, their numbers are diminished, but their size is increased; they ascend with the spermatic vein, on the right side quit it to cross the vena cava, and terminate in three or four absorbent glands by the side of the aorta, near the origin of the spermatic artery. On the left side they pass into glands in contact with the aorta, just below the renal artery. (Vide Plate VIII.)

The absorbents of the tunica vaginalis terminate in those of the testis.

OF THE DISSECTION OF THE INGUINAL CANAL.

This canal is bounded at the lower part by the external abdominal ring, formed by the tendon of the external oblique muscle ; at its upper part by the internal ring, formed by the fascia transversalis.

In dissecting it, after removing the integuments, the superficial fascia of the tendon of the external oblique muscle is laid bare.

An incision is to be made through the tendon of the external oblique, beginning above the abdominal ring, and extending near to the anterior and superior spinous process of the ilium. The edges of the divided tendon being then turned down, the inguinal canal is brought into view.

At the lower part of the canal, just above the abdominal ring, the spermatic cord appears in the centre, the cremaster muscle between it and Poupart's ligament, above it the tendinous insertion of the internal oblique and transversalis muscles, which pass behind the upper part of the abdominal ring to the sheath of the rectus muscle.

At the upper part of the canal, in this first view, the internal oblique is seen arising from Poupart's ligament, and crossing over the cord and part of the cremaster muscle in the form of an arch ; some of its muscular fibres blend with those of the cremaster.

Upon raising the lower edge of the internal oblique from Poupart's ligament, and turning it upwards, the transversalis abdominis appears. It arises from Poupart's ligament under the internal oblique, and also blends with some of the fibres of the cremaster.

It forms an arch over the spermatic cord, and is inserted, with the tendon of the internal oblique muscle, into the tendinous covering of the rectus. But the lower edge of the transversalis has a very peculiar insertion, which I have hinted at in my work on Hernia. It begins to be fixed in Poupart's ligament, almost immediately below the commencement of the internal ring, and it continues to be inserted behind the spermatic cord into Poupart's ligament, as far as the attachment of the rectus.

Thus the inguinal canal is endowed with muscular contraction, which, under the action of the abdominal muscles, serves to close it, and to lessen the liability to hernia.

Sometimes a portion of muscle descends from the tendon of the transversalis in the course of the linea semilunaris, to be inserted into the fascia transversalis behind the cord, and into Poupart's ligament. (See Plate V.)

It is this circular insertion of the transversalis which is the cause of stricture in inguinal hernia, in the course of the canal, and nearly at the upper ring. (See Plate V.)

Behind this insertion of the transversalis, the internal portion of the fascia transversalis appears, adhering strongly to the tendon of that muscle at the back of the inguinal canal.

Thus the inguinal canal is, at its anterior part, formed by the tendon of the external oblique; on its posterior, by the tendon of the transversalis, and by its folded muscular fibres; behind is the fascia transversalis, into which those fibres are also inserted. It contains the spermatic cord, and the internal oblique muscle.

Its lower part is bounded by the external abdominal ring, formed by the separation of the tendons of the external oblique muscle; and at its upper extremity are placed the two portions of the fascia transversalis, forming, with the tendon of the transversalis, the internal ring: the anterior portion is continued from the edge of Poupart's ligament to the outer side of the spermatic cord; the posterior, or internal, descending behind Poupart's ligament, to form the crural sheath, and ascending behind the spermatic cord, and tendon of the transversalis.

Between these two layers passes the spermatic cord. From the edge of the two portions of fascia, a layer of membrane extends, in a funnel shape, uniting itself with the spermatic cord: thus the cord becomes united to each aperture through which it passes; —at the external ring, by the fascia superficialis; and at the upper part of the canal, by membranous processes from the fascia transversalis, which descend upon, and envelope the spermatic cord, forming the fascia spermatica interna.

The epigastric artery, arising from the external iliac, at Poupart's ligament, curves inwards and upwards, behind the inguinal canal, to the rectus muscle, giving an artery to the cremaster in its course.

OF THE SPERMATIC CORD BELOW THE EXTERNAL RING.

The cord is covered by a superficial fascia, which is situated immediately beneath the integuments. It is loosely attached to the tendon of the external oblique muscle, and adheres strongly to the edges of the external abdominal ring, and unites the cord to them, so as to conceal the opening until the fascia is removed.

It descends upon the outer surface of the cremaster, adhering to it by a loose texture; and externally it blends with the cellular tissue of the scrotum. The fascia descends to the lower part of the testis, still adhering to the cremaster, and surrounding it.

The use of this fascia is to give support to the testis and its coverings; and by its loose connection with it and with the cord, still permits the free motion of the testis, and its power of eluding pressure or violence.

The second covering of the cord is the cremaster muscle.

Its origin is from Poupart's ligament in the inguinal canal, between the internal oblique, and transversalis muscles. It there blends with some of the fibres of both of those muscles:—below the origin of the fibres of the internal oblique, it arises from

Poupart's ligament nearly to the external ring; behind the spermatic cord it receives muscular fibres from the transversalis. It is also attached, on the inner side of the abdominal ring, to the lower part of the sheath of the rectus muscle.

From these attachments it descends upon the spermatic cord in loops, as Cloquet, the excellent French Anatomist, has shown.

It envelopes the vessels and nerves of the cord in its descent, and forms numerous tendons, which resemble, in their first appearance, nervous filaments. Its insertions are as follow:—

First, it forms a tendinous sling, which envelopes the lower part of the tunica vaginalis.

Secondly, it sends tendinous fibres into the inferior part of the testis and epididymis, and into the tunica vaginalis.

And, thirdly, it blends with some cords which surround and enclose the lower part of the vas deferens, and which may be traced to the upper orifice of the inguinal canal, and pass down upon the spermatic vessels. (Vide Plate VII.)

The cremaster muscle has an artery to supply it with blood which is the THIRD ARTERY of the spermatic cord.

The CREMASTERIC artery arises from the epigastric, near the internal opening of the inguinal canal. It passes inwards towards the lower part of the rectus and pyriformis muscles, nearly in the line of Poupart's ligament, but deeply seated; it then divides into two branches: the first passes to the rectus and pyriformis muscles; the second descends upon the back-part of the spermatic cord to the testis upon the cremaster muscle, to which it gives vessels in its course. (See Plate VI.)

The corresponding vein to this artery terminates in the epigastric vein, and a branch of a nerve accompanies them.

The use of the cremaster muscle is to draw up the testis *in coïtu;* for it presses the testis against the pubes and abdominal ring, and thus aids the passage of the semen as it is secreted.

When examined in a full-grown fœtus, it appears that the testis has been drawn down into it, as into a purse; and if the testis has not long descended, and its adhesions to it are slight, it can be easily drawn from the cord and testis, excepting at its lower part, where it firmly adheres to the tunica vaginalis reflexa, and to the remains of the gubernaculum, epididymis, testis, and vas deferens.

The course and distribution of the blood-vessels, absorbents, and nerves of the cord, I have already described.

ON THE DESCENT OF THE TESTIS.

As the length of the spermatic artery, which is increased by its serpentine course, seems to be necessary for its elaborate secretion, Nature has provided, that the testis should have been originally placed near the origin of its vessels, rather than the vessel should be formed through so long a space, and be from that cause in danger of imperfection; and that this is her design, is shown by the ovaria being placed in the fœtus, nearly in the same situation as the testes in the male.

The testes, therefore, in the first seven to eight months of the fœtal existence, are found situated upon the loins. They are said to be placed immediately below the kidneys, but this is correct only as regards the fœtus in the earliest months; they are placed upon the lower part of the psoæ muscles in a fœtus of five to six months.

The testis is circumstanced as the other abdominal viscera, being covered by the peritoneum upon its fore-part and sides, but not posteriorly; this investing portion of peritoneum is termed the tunica vaginalis testis of the adult, and extends over the tunica albuginea.

From the lower end of the testis and epididymis the gubernaculum proceeds, behind the peritoneum, but covered with it on its fore-part and sides. It is composed of several strong ligamentous fibres, which proceed through the inguinal canal, to the cellular membrane of the scrotum, in which it is lost.

The peritoneum of the lower part of the abdomen passes down upon, and adheres to the gubernaculum, so as to form a small pouch in the inguinal canal, to which the cremaster muscle is attached.

Above the testis, and behind the peritoneum, the spermatic artery passes from the aorta, a little below the renal artery, and enters the posterior edge of the testis, which is not covered by the peritoneum.

The spermatic vein passes from the posterior edge of the testis behind the peritoneum; on the left side, to the emulgent vein, and on the right, to the inferior cava.

The vas deferens descends behind the peritoneum, from the lower end of the epididymis, passing posteriorly to the gubernaculum over the psoas muscle and iliac vessels, to the duct of the vesicula seminalis behind the bladder.

The bladder, and even the vesiculæ seminales, in the fœtal state, are so little concealed within the pelvis, that they are readily exposed to view upon laying open the cavity of the abdomen.

The vas deferens is accompanied by the deferential artery, which springs from one of the vesical arteries of the hypogastric, and terminates in the epididymis, and tunica vaginalis.

The cremaster muscle, as far as I can distinguish it in the fœtus, passes upon the gubernaculum to the epididymis and testis, and is attached to the process of peritoneum which descends with the testis as a pouch, to the lower part of the inguinal canal; and the testis descends into this muscle as into a purse, as it is directed down by the gubernaculum, and hence the loops which it forms. (Vide Plate VII.)

If any one will be at the trouble to examine a fœtus at the eighth or ninth month, soon after the testis has descended, he will find that the cremaster may be readily turned aside from the spermatic vessels and upper part of the vas deferens, so as to leave them free from it; it can also be separated from the epididymis and testis, excepting at the lower extremity of each of these bodies, into which, as well as to the lower end of the vas deferens, it is firmly inserted, forming the fixed point for the action of this purse-like muscle.

In animals, in whom the testes remain in the abdomen, the cremaster still exists. I do not believe that it is the cause of the descent of the testis, nor that it is designed as a suspensor, but as a compressor of the testis.

I will merely put it as a query if the descent of the testis may not be assisted by the pressure of the fluid, contained in the abdomen of the fœtus, pressing upon the pouch of the peritoneum which adheres to the gubernaculum, and which assists in forming the tunica vaginalis reflexa?

If the testis has not descended at birth, it is often afterwards forced down either by a congenital hydrocele, or by a hernia congenita.

The descent of the testis begins at the very earliest period of its formation; and has perceptibly approached the groin more in the fourth than the third month, more at the fifth than the fourth, and so proceeds until it reaches the scrotum, which it usually does at about the eighth month, although subject to variety in this respect.

The peritoneum, which is attached to the gubernaculum, and the loose peritoneum, which lines the lower part of the abdomen, descend with the testis between the eighth and ninth months; for it is to be understood that the testis is not drawn into the pouch, but the testis, pouch, and loose peritoneum of the lower part of the abdomen descend together.

The peritoneum, which is attached to the gubernaculum in the fœtus, becomes the tunica vaginalis reflexa of the adult. While that portion of it which covered the testis in the abdomen, remains the tunica vaginalis testis, of man; but that additional portion of peritoneum which is drawn down from the abdomen, by the perfect descent of the testicle, is the tunica vaginalis of the cord.

Very soon after the descent of the testes, the serous cavity of the tunica vaginalis becomes closed from that of the peritoneum by the process of adhesion; it closes first towards the abdomen, then gradually lower down, but the exact time of its being shut is uncertain. At the ninth month I have often found both open, and I have also seen one open, and the other closed.

The peritoneum becomes shut from the abdomen nearly to the testis; and thus forms it into a bag, which is the tunica vaginalis, from which a vaporous secretion proceeds in its natural state, but which becomes serous when the secretion is too abundant, producing hydrocele of the tunica vaginalis.

The time at which the testes descend, as has been before observed, varies greatly in different persons.

They generally reach the scrotum before the birth of the infant, but it often happens that one is placed in the scrotum, and the other remains in the abdomen, or in the inguinal canal, just above the external ring, or sometimes just emerging from the ring. In these situations they are exposed to injury and violence; and if perminently remaining there become prone to disease of a malignant character.

I have many times seen the testis completing its descent as late as the thirteenth and seventeenth year, which period, being about the age of puberty, probably some natural excitement at that epoch induced the change of position. But the descent is in some cases not accomplished until the age of twenty-one.

When the testes remain in the abdomen, it makes a strong impression upon the patient's mind, as a suspicion arises that his virility is lessened or destroyed. In a case of this kind I have known the unfortunate subject of it commit suicide.

Yet the testes in this case, and in others which I have examined them, were nearly of the same size as healthy testes; and the seminiferous tubes were full of semen.

It often happens that when a testis remains in the inguinal canal, there are severe spasms of the cremaster, or muscles of that canal, accompanied with violent pain, and only relieved by the hot bath and by fomentation.

Although the tunica vaginalis is generally closed at birth; it sometimes remains open on one, or even both sides.

This opening is sometimes so small as to admit serum only to descend into it, and then a congenital hydrocele is produced.

A truss applied in infancy, by closing the canal, cures this disease; the water being absorbed as the tunica vaginalis becomes closed.

The opening of the tunica vaginalis is sometimes only partially closed, and permitting hydrocele of the spermatic cord; but which disease may also be the result of serous cysts forming in the cord, more especially just above the testis.

The opening of the tunica vaginalis in some instances remains small until the adult age, and it then becomes suddenly dilated by the accidental protrusion of intestine, producing congenital hernia; and this disease I have several times known to occur suddenly, from some very slight cause, without the patient ever before having been the subject of a hernial protrusion.

More frequently, however, the tunica vaginalis, when unclosed, admits the protrusion of the intestine in childhood, which being in contact with the testis, constitutes a congenital hernia.

In those cases in which the testicle has not descended at birth, it often happens, that a hernia becomes the means of its descent; and such a hernia should remain without a truss being applied, until it has brought down the testis into the scrotum. A testis late in its descent, and protruded by hernia, is often lessened in its bulk; but the testicle on the opposite side, assisted by this diminished organ, is sufficient for the procreation of children.

The tunica vaginalis is sometimes closed by a film of adhesion; which, becoming elongated by intestinal protrusion, forms a sac, in the mouth of which the intestine may become strangulated, and cause the patient's death, if not relieved by an operation.

OF THE NERVES OF THE TESTIS, SPERMATIC CORD, AND PARTS ADJACENT.

Three sets of nerves supply the testes and their appendages: the first are those which are distributed in the vicinity of the external ring; the second, the external spermatic nerves, distributed to the cord; and the third, the spermatic plexus, which is derived from the grand sympathetic, and which supply the testes themselves.

The first nerve, the inguino scrotal, is derived from a muscular branch, which may be traced to the upper part of the lumbar plexus, arising from the first lumbar nerve. It passes downwards over the quadratus lumborum, to ramify between the abdominal muscles, and to terminate in cutaneous nerves. The principal branch of this nerve is found piercing the internal oblique, on the inner side of the spinous process of the ilium, and just above Poupart's ligament. It then runs between the internal oblique, and tendon of the external oblique muscle, towards the external ring, through which it passes in conjunction with the spermatic cord ; and, immediately dividing into a number of filaments, is finally distributed to the skin of the groin, the upper part of the scrotum, and root of the penis.

Sometimes, instead of one, there are two branches passing through the ring ; and occasionally one nerve is formed by the junction of two or more filaments, which pierce the fibres of the internal oblique separately, and unite before they emerge with the cord.

Secondly, the external spermatic or genito crural nerve, which is also derived from the first lumbar nerve, pierces the upper part of the psoas muscle. It then descends towards Poupart's ligament, lying on the psoas, or rather upon its fascial covering, and divides into two branches. One of these, the smaller inner, or cremasteric branch, is closely connected with, and partly covered by the spermatic vessels, in company with which it passes through the internal ring and immediately supplies the fibres of the cremaster : here it divides into a number of filaments, most of which are distributed to that muscle before it leaves the inguinal canal. Two long and delicate branches may, however, be traced through the external ring, descending one on the fore, the other on the back part of the cord, until they are lost in the coverings of the testicle, especially supplying the dartos; this nerve is distributed in the course of the cremasteric branch of the epigastric artery. The second branch of the external spermatic is a cutaneous nerve, which passes under Poupart's ligament over the iliac artery, and divides into twigs, which supply the skin at the groin, and inner part of the thigh. Some of these branches become sub-cutaneous at the crescentic margin, and on the fascia lata itself lower down. This nerve is larger or smaller in proportion to the size of the external cutaneous of the lumbar plexus, and sometimes supplies a considerable portion of the skin of the thigh usually allotted to the latter nerve.

Thirdly, the spermatic plexus,* which may be considered as consisting of two portions; the one descending with the spermatic vessels, the other coming from the interior of the pelvis, in close connexion with the artery of the vas deferens. They meet at the internal ring.

The *first portion* is derived from branches of the superior mesenteric, renal, and aortic plexus. Three or four branches pass down from the nerves which surround the root of the superior mesenteric artery, some of which become attached to the spermatic artery where it arises from the aorta, while others join two or three small ganglia on the inferior cava, and which receive several filaments from the aortic plexus.

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* This description is of the nerve at the right side.

From these ganglia small twigs are given off, which also become connected with the spermatic artery; and when the latter has passed over the cava, and joined the spermatic vein, two or three considerable branches are received from the renal or emulgent plexus. The plexus thus formed, receiving two or more filaments from the aortic plexus, descends with the spermatic artery, closely adhering to, and interlaced with the vessels of the spermatic cord, and descending with them become distributed to the testis.

The *second portion* of nerves going to the cord is derived from the hypogastric plexus, which sends some branches of nerves ascending with the deferential artery, and entering the cord at the internal ring, adhering in their course to the peritoneum of the side of the bladder and at the internal ring. The nerves then descend in the inguinal canal, and below the abdominal ring, on the coats of the vessels with which they are not only united, but almost incorporated.

In tracing the nerves of the spermatic cord and testis below the ring, it is very difficult to distinguish them from the numerous tendons of the cremaster muscle, and from some tendinous cords which accompany the vas deferens and spermatic artery.

If the peritoneum at the internal ring be examined, it will be found firmly united by tendinous cords to the fascia transversalis. These cords, descending with the vas deferens, form a sheath to it, and, passing from one convolution to the other, preserve it in its convoluted state, and terminate in being fixed in the cauda epididymis, and lower extremity of the testis, blending there with the cremaster. In the same manner cords pass down with the spermatic artery, and form a sheath, by which it is enveloped, to preserve its tortuosity.

It is only necessary to dissect closely on the coats of the vas deferens and spermatic artery, to at once discover these cords, especially below the external ring. (Vide Plate VII. figs. 2 and 3.)

The testis in infancy is capable of being injected. At two years the vas deferens, epididymis, vasa efferentia, and rete exist; but the tubuli seminiferi are imperfect, or are too small to receive injection.

In advanced age the testis becomes reduced and relaxed, from the diminished size of the seminiferous tubes, and from the smaller quantity of fluid which they contain.

It is common, in advanced age, to find the caput epididymis diseased; several of the lobes of the vasa efferentia being converted into a yellowish brown solid structure.

In age the seminiferous tubes become small; they appear yellow instead of red, from their having less arterial blood; and it often happens that a considerable number of them become cords instead of tubes, assuming a ligamentous appearance. A varicose state of the left testis is also a disease frequently concomitant with age.

The testis does not in general become absorbed, when partially diseased, although its functions may be interrupted, even to the complete obstruction of the passage of semen.

In 1823 I made the following experiment on a dog. I divided the vas deferens upon one side, and the spermatic artery and vein on the other.

The testis upon that side on which the artery and vein were divided, gangrened, and sloughed away.

The testis on the side upon which the duct was divided, became somewhat larger than natural. I kept the dog for six years; during that time he was twice seen *in coitu*, but the female did not produce. This was in 1827.

In 1829 I killed him, and found the vas deferens below the division excessively enlarged, full of semen, and its extremity closed, the upper portion, however, remained pervious from its point of division, to its termination in the urethra. A small space was found to exist between the two divided portions.—(See Plate IX. fig. 3.)

The testis sometimes becomes wasted, of which I have given a Plate; and in confirmation of Mr. Hunter's opinion of the use of the vesiculæ seminales, the vesicula on that side was certainly as large as on the other.—(See Plate X. fig. 2.)

The wasting of one testis at an early period does not prevent the person in after-life having children.

Mr. H——, a gentleman in the neighbourhood of Lynn, in Norfolk, consulted me for a disease in his bladder; and, upon examining him, I found his left testis absorbed, so that nothing remained but a small body not larger than a horse-bean. His testis wasted at 23 years of age, from absorption succeeding inflammation. He has been twice married: by his first wife he had one child; by the second he had five children.

The removal of one testis does not seem to diminish the virile powers. A gentleman had his testis removed in January 1821, for an enlargement and great hardness. He recovered in three weeks. His wife, by whom he had already one child, nursed him during his confinement. In the month of March she proved pregnant, about nine weeks after the performance of the operation.

Mr. Headington, Surgeon of the London Hospital, informed me that he knew a man who had lost one testis by an operation, and who had afterwards several children.

A man, whose testis had been absorbed for fourteen years, by wearing a truss for hernia congenita, has since married, and has now a child not quite a year old.

It has twice fallen to my lot to remove the testis of persons who had already lost one.

The first operation was performed upon a man of the name of Wallis, who had one of his testes removed in 1799, by Mr. Cooper, my uncle and predecessor at Guy's Hospital.

The second operation was performed by myself in Guy's Hospital, in June, 1801, for a chronic abscess in the testis. On visiting him four days after the operation, he informed me that he had, during the last night, an emission, which appeared upon his linen; and, struck with the curiosity of this circumstance, I requested Mr. Travers, then my apprentice, occasionally to visit him after his recovery, and departure from the Hospital; and I have myself, during the twenty-nine years which have since elapsed, repeatedly seen him. He had been married prior to the loss of one testis.

For nearly the first twelve months, he stated that he had emissions *in coitu*, or that he had the sensations of emission. That then he had erections and coitus at distant intervals, but without the sensation of emission. After two years he had erections very rarely and very imperfectly, and they generally immediately ceased upon the attempt at coitus.

Ten years after the operation, he said he had during the past year been once connected.

In 1829 he visited me, because he was a severe sufferer from piles. He then stated that for years he had seldom any erection, and then that it was imperfect; that he had no emissions from the first year of the operation; that he had for many years only a few times attempted coitus, but unsuccessfully; that he had once or twice dreams of desire, and a sensation of emission, but without the slightest appearance of it. The penis is shrivelled and wasted. He shaves once a week, and sometimes twice. His voice, naturally rather feeble, remains as at the time of the operation.

From this man's declarations, I believe that the history of eunuchs, if perfectly castrated, has been very much misrepresented; for it would seem that, after a few months, this patient lost all seminal emission, but that an imperfect erectile power remained for a few months more; and that then, excepting at very distant periods, even that power ceased, and the penis became shrivelled and diminished.

The second case in which I removed the testis, was in a lad in Guy's Hospital, aged sixteen years, who had previously the other testis extirpated. The disease each time was a scrofulous abscess, with subsequent ulceration. The lad had not reached puberty, and he was very weakly and emaciated. Five years afterwards, as I was stepping out of my carriage at a patient's door, a fat sleek-looking young person said—" How do you do, Sir?"—I said, " Very well, but I do not know you."—" Have you forgotten removing my testicle in Guy's Hospital, five years ago?"—" Oh no, I recollect you; you look very well.—" Yes, but I am very unhappy;" and he immediately burst into tears. —" Why, what do you lament?"—" Oh Sir, that I am not as other men—I often wish that I were dead." Desirous to cheer him, I said—" You are a lucky fellow, for you are saved from many evils."—He shook his head, and I left him sorrowful.

Having described the different parts which compose the testis, and mentioned the uses of each, it is not my intention to enter more largely into the physiology of this organ. The structure of the testis being understood, the veriest tyro must readily comprehend the course of the semen. It is secreted in the tubuli, and is conveyed into the rete; from the rete into the vasa efferentia. It next passes through the epididymis to the vas deferens, which opens, in common with the duct of the vesicula seminalis, at the veru montanum, in the prostatic part of the urethra.

PART II.

GENERAL OBSERVATIONS

ON THE

DISEASES OF THE TESTIS.

CHAPTER I.

THE Diseases of the Testicle, like those of the Breast, may be divided,

First, into those which are the result of COMMON INFLAMMATION, of the ACUTE or CHRONIC kind;

Secondly, into the SPECIFIC, but not MALIGNANT, in which the action differs from common inflammation;

And, thirdly, into the Complaints which are SPECIFIC and MALIGNANT.

The first, or acute, frequently yields after having spent its action upon the part, by what has been technically termed resolution, producing but little change in its organization; or it sometimes terminates in the production of an abscess, which is rapid in its formation, yet slowly discharges itself by ulceration, for a reason to be hereafter explained.

But if the inflammation be of the chronic kind, its progress in the adhesive stage is slow, equally tardy in its suppurative and ulcerative processes, and it produces sinuses and exuberant granulations, which are difficult of cure, and require a peculiar management.

The second, or specific diseases, which are not malignant, seldom proceed to suppuration. Some of them occasion such changes in the part as to lead to a necessity for its removal, as the hydatid disease; whilst others, as the scrofulous, the mumps, and perhaps I may add the venereal disorder of the testicle, yield to the action of medicine, and permit the part to recover its functions.

The third kind of complaints are those which are malignant—as the fungus, and the scirrhus testis;—the former of which is much more frequent than the latter, which is, in my belief, a very rare disease.

The diseases of the testicle are either local only, or constitutionally local; and the constitution may be also secondarily affected by the local irritation.

Acute inflammation, whether arising from accident, or sympathy, is a local disorder; or, if the constitution be affected, it is only secondarily. But chronic inflammation originates in a peculiar state of the constitution, as well as of the part itself, which disposes it to a languid and tardy course through the effects of inflammation.

Specific Diseases, which are not malignant, may be purely local, as the hydatid or encysted disease; or they may be constitutional as well as local, as the scrofulous testis; but the results of both, are different from those of common inflammation.

In malignant diseases of this organ, the disposition to the complaint is founded on unhealthy changes of the constitution; but their chief distinction is in a specific action in the part by which they are capable of affecting and contaminating not only the structures immediately in contact with them, but by extending their influence to the more distant parts by the intervention of the absorbent vessels and their glands. Frequently, however, similar diseases exist in other and remote structures, entirely independent of each other.

That these diseases are the result not only of constitutional predisposition, but also of specific local action, is proved by the circumstance, that if a malignant disease be removed, the wound, made by the Surgeon, often heals rapidly, as in a healthy person; but that subsequently, and independent of the inflammation which cures the surface, the complaint again manifests itself in its original malignant character, proving that the disease differs from common inflammation, and that in fact it does not in general return until common inflammation has subsided.

THE DISEASES OF THE TESTICLE MAY BE ARRANGED UNDER THE FOLLOWING HEADS:—

1st. Common inflammation, whether acute or chronic—Wasting of the testicle.

2dly. Specific actions which are not malignant, as the hydatid or encysted disease.

The irritable.

The sympathetic affection of the testes concomitant with mumps.

The ossific; and to these may be added single cysts, and solid tumours of the epididymis, or testes.

The scrofulous.

The venereal.

3dly. The malignant diseases are the fungoid and scirrhus.

From this account I have intentionally excluded the diseases of the tunics, and of the spermatic cord—as the hydrocele, hœmatocele, varicocele, and several other complaints which I shall describe in another part of this Work.

The body of the testicle is less prone to disease than the gland of the breast; but its cord and its tunics are liable to a great variety of complaints.

It is here proper to observe that the diseases of the breast are often uncontroulable, and frequently require operations; but that those of the testicle generally yield to treatment: and all my professional brethren of any experience will allow that many testes have been unnecessarily and precipitately removed. How often have I heard patients exclaim––" Sir, my testicle, which was condemned for operation last year, is now quite well!" and how frequently, when the diseased part, which has been removed, is cut open, is it found, that the complaint, with patient perseverance in the remedies, might have been cured!

Still the testicle is very frequently diseased; and the following may be mentioned as causes for those complaints, independent of constitutional predisposition.

First––Their pendulous situation renders them more liable to inflammation than other parts; for the blood gravitates into them, and returns with difficulty by the veins; and hence general relaxation of the body produces congestion, and inflammation in them.

Secondly—The excitement to which they are liable from passion, and which often cannot immediately be indulged, leads to an accumulation of seminal secretion, and to a painful and excessive distension of the seminiferous tubes, which is sometimes followed by inflammation.

Thirdly—They are exposed to injury from blows or pressure.

Fourthly—From the strong natural sympathy which exists between the testicles and urethra, and from their connection in function with that canal and the prostate gland, they are very apt to become inflamed sympathetically. The testes sympathise with some parts of the urethra much more than others; for considering the urethra in its divisions of the spongy, membranous, and prostatic portions, it will be found, that the testicles suffer much more frequently from complaints in the membranous, and prostatic, than in the spongy portion; and, in short, that as irritation descends in the urethra, it is most prone to produce a sympathetic influence on the testicles.

Fifthly—The changes which the testes undergo at the age of puberty, and in old age, but more particularly at the latter period, sometimes induce a morbid action in these organs; but I have seen an inflammation occur in the testicle of a healthy boy of thirteen, without any obvious cause.

Sixthly, the descent of the testicle—This process, although usually accomplished prior to birth, is not always completed at that period, but is often delayed for some years, and now and then to the adult age. The testis then remains at the lower part of the abdomen, or in the groin, where it is exposed to injuries from blows; and all parts, thus abnormally circumstanced, are liable to suffer from diseased changes.

Seventhly—The vicissitudes of temperature sometimes give rise to inflammation. These causes will be more fully detailed hereafter; but they are now merely mentioned in a general view, as exciting causes of disease.

CHAPTER II.

ON ACUTE INFLAMMATION OF THE TESTES.

TESTITIS.

Hernia humoralis has been the term usually employed by Surgeons, to express the inflammatory state of this organ; but it is an appellation obviously founded on false physiological views, and upon mistaken pathological principles. The humoral pathology has vanished under better defined, and more correct pathological opinions; and diseases are at present attributed, more to the altered actions of the solids, than to a change in the nature of the fluids. Yet perhaps the moderns have gone into a contrary extreme, and have too much lost sight of the condition of the fluids in the morbid changes of the body. For it is clear that the secreted fluids are often so changed in their nature, as to be capable of producing disease, and even of becoming poisonous; this is exemplified by the influence of the discharge of gonorrhœa—the matter of a chancre—the secretion of a small-pox pustule, and the fluid of a vaccine vesicle. My late friend Mr.

Coleman has also found, that if the blood of a horse affected with glanders, be injected into the veins of another and healthy horse, it will produce the glanders in that animal; and thus he proves, by direct experiment, that the fluids are affected in that disease as well as the solids; for its blood, the mucus of the membrane of the nose, the sinuses of the bones of the head and face, and even the lungs themselves, are brought into a diseased state. But the term hernia humoralis is still frequently most improperly applied to inflammation of the testis; for although the disease be the consequence of gonorrhœa, it has nothing gonorrhœal in its character, or venereal in its nature; and I shall therefore denominate this disease *Testitis.*

Even when sympathetic in its origin, it resembles common inflammation in its progress, and termination, and may be therefore either acute, or chronic-testitis.

SYMPTOMS.

The first symptom of this disease, when it arises from sympathy with the urethra, is an irritation of the membranous or prostatic portion of the canal, as if some drops of urine still remained in the beginning of the urethra; and this is succeeded by a tenderness in the spermatic cord at the abdominal ring, and by swelling and pain in the epididymis.

The testicle next swells, soon increases to two or three times its natural bulk, and becomes so tender, that the pressure of the thigh against it, can scarcely be borne.

Its weight is also sensibly increased, and it hangs upon, and painfully draws down the spermatic cord, so that the patient finds great relief by supporting it with his hands.

The pain is obtuse, and more difficult to bear than that which is more acute; it resembles the suffering which is produced by squeezing the testicle, and indeed arises from the same cause; for the glandular structure of the testis swells, whilst the tunica albuginea being tendinous, and consequently inelastic, does not yield to the swelling from within, but resists its increase, and presses upon the sensitive internal structure of the testicle, producing the dull, heavy, and aching pain of which the patient so bitterly complains.

The pain and swelling extend along the spermatic cord into the inguinal canal, producing great uneasiness in the groin, and in the vicinity of the spinous process of the ilium, the hip, and the inner part of the thigh on the affected side, and at length fixes itself more particularly in the loin; this arises from the spermatic nerves having their principal origin from the renal and lumbar plexus. From the communication between the renal and spermatic nerves with the nerves of the stomach by the solar plexus, and with those of the intestines, through the mesenteric plexus, sympathetic affections of these organs frequently occur, the stomach becomes affected with nausea and sometimes severe vomiting, and pain in the intestines resembling colic, attended with obstinate constipation, are the frequent results of testitis. The inflammation and pain in this disease sometimes extend to the neck of the bladder, producing difficulty in the discharge of the urine, and a frequent desire to do so.

Although the testicle may be very much swollen, it still retains its original form, being rounded upon its fore part, but somewhat flatter upon its sides, and it feels excessively hard.

The scrotum soon becomes thickened, and redder than natural, and an effusion into its cellular tissue makes it pit under pressure; its veins are fuller, and more apparent than usual, and when opened, they bleed very freely.

The epididymis swells more in proportion than the testis, which is owing to its covering being less compact, and it remains longer swollen than the testicle. Its two extremities, the globus major and minor, are more affected than its body, and the swelling of the former is generally very perceptible before the spermatic cord becomes inflamed.

When the spermatic cord itself becomes enlarged great uneasiness is experienced at the seat of the abdominal ring, and in the course of the inguinal canal, from the pressure of the tendon of the external oblique muscle upon the inflamed and swollen cord.

The cremaster muscle in some cases is also affected with spasm.

Many days elapse before the symptoms, in the order of their succession, arrive at their height, and it is still longer, even when restoration commences, before the parts return to their original and healthy state; and deranged function, with evil consequences are often produced, which ever afterwards remain.

If the inflammation arise from gonorrhœa, the discharge from the urethra usually stops, or lessens considerably; and as the inflammation subsides, the discharge generally returns, and hence it has been recommended to endeavour to reproduce it, with a view to diminish the disease in the testicle.

During the violence of the local symptoms, the constitution often suffers severely from irritative fever. The tongue becomes furred; the pulse is quick and hard; the skin is hot, and the bowels are constipated: also if blood be drawn from the arm, it has a buffy covering, and is cupped upon its surface.

It very rarely happens that an acute inflammation of the testicle proceeds to suppuration when it is sympathetic with the urethra; and it may be observed in other inflammations, called sympathetic, that suppuration does not generally follow; but when inflammation of a testicle is the effect of a blow or any other violence, or of vicissitude of temperature, suppuration is rather more liable to occur, when all the symptoms become exceedingly aggravated; and rigours are added to those which I have already described.

The matter is confined by the tunica albuginea; and as this membrane, like other tendinous structures, possesses but few absorbent vessels, it does not readily give way to the pressure of the abscess; and it is a long time before it discharges itself, even after the matter can be distinguished by its fluctuation.

The abscess generally breaks at several apertures, and sinuses follow, which are very difficult to heal; and from them issue a seminal, as well as a purulent discharge, which stiffens the linen, acts as a fresh source of irritation, and prevents the opening on the surface from readily healing.

ON THE DIAGNOSIS OF ACUTE INFLAMMATION OF THE TESTIS.

This disease is not very liable to be confounded with other disorders of the testicle; and the only hesitation which I have seen in determining its nature, has been in distinguishing it from hernia, to which its symptoms bear some slight resemblance.

When inflammation of the testicle is excessively severe, it produces nausea, vomiting, costiveness, and swelling of the spermatic cord into the groin, with much pain in the direction of the inguinal canal, which extends into the abdomen; and as these symptoms are more or less concomitant with strangulated hernia, a false opinion of the nature of the disease may possibly be formed. But still the distinction is easy; for it is only with the congenital hernia that there can be any resemblance; as in the common inguinal hernia, the testicle can be readily distinguished, but in the congenital hernia the testicle is involved in the disease, so as to be incapable of being distinctly perceived.

But the history of a hernia, its long continuance, its descent from the abdomen, and its frequent recurrence, contrasted with the gradual approach, the excessive hardness, and severe pain in the loins accompanying inflammation of the testicle, will serve as distinguishing signs. My friend Mr. Samuel Cooper has described a case of testitis, in which, on the fifth day, the patient began to complain of so much pain in the abdomen, with almost incessant vomiting, great constipation, and high constitutional disturbance, as might have induced a less intelligent Surgeon to suspect the existence of strangulated hernia; but the want of a particular protrusion at the ring, the absence of tension in the abdomen, the pain being confined to one side of the belly, and its not being augmented by pressure, were the marks of distinction by which he formed a just diagnosis.

But if a hernia had existed on the side in which a blow had been received, and the patient had a swelling attended with exquisite pain, sickness, and vomiting—redness of the scrotum, or even a purple appearance of it—constipation of two or three days' continuance, with tenderness of the abdomen, then great caution will be required in forming a judgment of its nature, and in determining on its treatment. Under such doubtful circumstances it would be judicious to give a purgative injection immediately, as well as aperient medicine; for, free evacuation from the intestines, should they follow, will determine the question. The hardness of an inflamed testicle compared with that of a hernia, its difference in form, and the greater pain with which it is accompanied will, however, always assist in forming a diagnosis between the two diseases.

Hematocele, which is a collection of blood in the tunica vaginalis testis, is also liable to be confounded with inflammation of the testicle; but the distinguishing marks are, the blow by which the swelling was almost instantaneously produced, the ecchymosis with which it is generally accompanied, and the little pain the patient suffers, in comparison with that, which attends acute inflammation of the testicle.

OF THE CAUSES OF INFLAMMATION OF THE TESTICLE.

The most frequent cause of inflammation of the testis is irritation in the canal of the urethra; for, naturally connected in their healthy functions, these parts readily sympathise in disease:

but, as has been observed, with some portions of the canal, the testicle is more prone to sympathise, than with others.

The prostatic portion of the urethra is by continuity of structure connected with the testicle, and frequently sympathetic affections occur between them; the membranous portion also, when inflamed leads to affections of the testicle, but more rarely, than the prostatic portion.

The testicle is much less disposed to sympathise with the anterior or spongy part ; and when inflammation and irritation exist in the first six inches of the urethra from the glans, the testicle rarely inflames; but from irritation in the remaining posterior three inches of the canal, it frequently becomes affected.

In the early stages of gonorrhœa, inflammation of the testicle rarely occurs; but when ten days to three weeks have elapsed, it frequently happens; the rationale of which seems explained by the following dissection. A person, executed at the Old Bailey, was brought into the Theatre of Surgeon's Hall, as a subject for the Lectures; and this man had a gonorrhœa at the time of his death; when his urethra was cut open, although the inflammation was greatest in the first three inches of the canal, yet the lining membrane was inflamed to the membranous portion of the urethra; and even blood had been extravasated under its mucous membrane.—The veru montanum, the termination of the ducts of the vesiculæ seminales, and the vasa deferentia in the urethra thus became irritated, and the inflammation extended probably along the interior of the canal by continued sympathy. But although the sympathy is the strongest, and the communication most ready, between the testis and the membranous and prostatic portions, yet irritation in the beginning of the urethra will sometimes produce it; for I have seen cold water injected into the urethra bring on a swelling of the testicle.

But it may be said, if the cause of testitis be extension of inflammation, why do not both testes become affected?—and to this I should reply, that the disease of one testicle, diminishes the tendency to inflammation in the other; or otherwise, that whether the affection were sympathetic, or an extension of inflammation along the canal, the difficulty would be the same in explaining, why both should not be affected.

I have already observed that in gonorrhœa the inflammation of the testis does not occur until after the inflammation in the beginning of the urethra has passed its height, and that it is generally preceded by a frequent desire to make water, and an intolerant impulse immediately to do so, as well as by a sensation like drops of urine trickling through the membranous portion of the urethra; these are the symptoms of irritation in the vesical extremity of the urethra, which is usually followed, first by tenderness of the spermatic cord, and subsequently by pain and swelling of the epididymis.

It is not therefore the most acute inflammation in the urethra which produces the effect, but usually its declining stage, when the inflammation is rather extensive, than violent, and of the erysipelatous character.

The employment of injections has a tendency to produce acute inflammation of the testis, as, by lessening the discharge from the urethra, they lead to a distended and turgid state of its vessels, and the inflammation is rendered more extensive in the urethra. Astringent stimulating injections often produce this effect. If injections be employed in gonorrhœa, the patient should be directed to press the urethra two inches from its orifice, to prevent the fluid passing beyond that point of the urethra, towards its membranous or prostatic portions.

The introduction of bougies or catheters into the membranous or prostatic portion of the urethra, often produces inflammation of the testis; but this rarely happens when the instrument is passed only three or four inches. Also when caustic bougies are introduced to the membranous part of the urethra, they frequently occasion the same effect.

Instruments are often used unnecessarily; for if a soothing plan be followed, and instruments not introduced, the obstructions, which are the result of temporary inflammation, will cease, being only the effect of congested vessels, and not from the deposition of any adventitious substance.

Mr. B—— had a gonorrhœa, which had continued for six months, for which he used a very strong injection, and, as he thought, produced a stricture in the urethra. For this obstruction a bougie was passed, and it produced inflammation of the bladder, which obliged him to desist from its use. He had no other symptoms until a year and a half after, when he felt an irritation in the membranous part of the urethra; and upon making water, he discharged a quantity of blood, and on the following day he had inflammation of the testicle, which soon subsided; but after three weeks, under violent exertion, he had a relapse: he has since been free from obstruction, although a little tenderness remains in the testicle.

Any injury to the prostate gland not unfrequently produces the same effects; as is sometimes seen after the operation of lithotomy, as I witnessed in a patient of mine of high legal character, who suffered most severely from this cause, during his recovery from that operation.

The prostate gland, even in that enlargement which seems almost a concomitant with age, is sometimes accompanied with inflammation of the testis.

Inflammation in the neck of the bladder produces this disease; and a calculus in the bladder pressing upon the orifice of the urethra, or a stone passing the ureter, has been known to occasion testitis, although the latter, generally only produces a spasm of the cremaster muscle.

A blow upon the testes is a frequent cause; and if it be severe, it produces vomiting upon the instant, almost upon the hand which inflicted the injury; and is immediately succeeded by a violent attack of inflammation.

A person consulted me with an inflammation of the testis, who, two months before being called out of bed, and having to cross a dark room, struck the testicle a severe blow against an open drawer. The next morning he could not make water; and being in dreadful pain, he applied to a Surgeon to have his urine drawn off; who observed, very properly, that the catheter would probably add to the injury, and recommended fomentations, which about two o'clock in the afternoon relieved him, and the urine was discharged; but he found it tinged with blood. From the infliction of the injury to the period of his consulting me the testis has been inflamed, and he has had a discharge of pus and blood occasionally from the urethra.

The most frequent cause of violence, is, from a person being thrown upon the pommel of a saddle whilst riding on horseback, which bruises the testis, effuses blood into the scrotum, from laceration of its vessels, and is followed by great swelling, and severe inflammation.

A wound of the testis does not produce the pain or inflammatory effects which might be anticipated; for I have several times known a lancet, and even a trocar, thrust into its substance. It is followed by a sickening pain, and the patient sometimes vomits; but the wound heals readily, and without suppuration. In one case, however, in which the trocar was twice thrust into a testis by Dr. ——, violent inflammation and suppuration succeeded.

An undescended testis is frequently exposed to injury and consequent inflammation. Mr. Pott has given a case of a young man who fell upon a piece of timber, and a swelling in his groin succeeded the blow, attended with exquisite pain, sickness, vomiting, constipation of the bowels, and tenderness in the abdomen. He had formerly a hernia, for which he had worn a truss. By the use of glisters and aperients, the more urgent symptoms had been relieved; by fomentations and poultices the swelling of the groin had been lessened; when it was discovered that the testis never having descended into the scrotum, had, while within the inguinal canal, received the injury, which had caused all the symptoms.

The application of a truss upon an undescended testicle, when mistaken for a hernia, or from its being really accompanied with hernia, produces great pain and inflammation of the testicle. Such a mistake can only arise from the carelessness of a Surgeon who has failed to observe that the scrotum on that side is empty, which fact alone, is sufficient to explain the nature of the case.

Vicissitudes of temperature affect the scrotum, as much as any part of the body; and consequently, by sympathy at least, induce inflammation in the testicle itself.

The effect of diminished temperature of the scrotum will be seen in the following case:—

A patient in Guy's Hospital, who had been in the retreat with the Duke of York's army in the Netherlands, and exposed to excessively severe cold, had his scrotum become frost-bitten, which sloughed away, exposing the tunica vaginalis, and tendon of the cremaster muscle, which were, upon his admission into the Hospital, covered by granulations, but no cutaneous covering was yet restored. The granulations had but little sensibility, I concluded therefore that they arose from the cremaster, rather than from the tunica vaginalis, their surface discharged but a small quantity of matter. The slough had extended to the groin, and divided the absorbent vessels of the penis, which was swollen to an enormous size. A cast of this man, made by Mr. Lewis, Surgeon, in Mark Lane, is preserved in the Museum of St. Thomas's Hospital; and I have an excellent drawing of the parts in my possession.

The sudden change of dress, from a warm to very slight thin clothing, may produce inflammation of the testicle. Sponging the parts with cold water, when the body is heated and relaxed, is likely to be followed by the same effect; or going into a cold bath, when the person is excited by exercise.

The excitement of the passions, with an incapacity to indulge them at the moment, produces excessive pain at the time; and in consequence of the great distension of the seminiferous tubes, and the unyielding nature of the tunica albuginea, inflammation in very irritable persons not unfrequently follows.

ON THE EFFECTS OF INFLAMMATION OF THE TESTICLE.

An effusion of serum into the tunica vaginalis is a frequent effect of inflammation of the testicle; but this species of hydrocele usually becomes absorbed, as the inflammatory attack subsides.

The second effect which it produces, is adhesion and thickening of the tunica vaginalis, which is often mistaken for a disease of the testicle itself. This adhesion of the tunics is a very frequent consequence of inflammation of the testicle; and I have found, on examining testicles which felt harder than usual, that one surface of the tunica vaginalis was glued to the other, in some cases partially, and in others entirely, by which the mobility of the testicle in the scrotum had become diminished, and it less easily eluded pressure and external violence.

A swelling of the epididymis is a third effect of inflammation, which is sometimes placed at its lower, and sometimes at its upper part: when at the lower, it is seated in the cellular tissue of the vas deferens, where it forms its first convolutions; but frequently it is not an effusion into the interior of the duct, which the patient will be gratified to learn, as his mind must have been rendered anxious about its influence on the function of the part.—Often these indurations are the effect of adhesion in the tunics only. When seated in the upper part of the epididymis, in the globus major, adhesive matter is effused into the cellular membrane, between the coni vasculosi, at their termination in the epididymis; and sometimes a sac, containing a mucilaginous fluid, is found at this part.

This portion of the epididymis is more frequently diseased than any other part of the testis, or epididymis; but the result is less important here than in other parts, because some of the vasa efferentia, and coni vasculosi are still capable of conveying the semen from the testicle, to the epididymis.

The coni vasculosi under this state of disease become thickened, hardened, and of a dark brown colour: in six testicles which I received at one time for dissection, of old persons, four of them were thus changed.

I have also a preparation in my possession, in which, after inflammation, a tumour, somewhat larger than a pea, was seated amidst the seminiferous tubes of the testicle, surrounded by an extremely vascular surface; and the testis was larger than natural.

In general, I observe that where there are marks of inflammation upon the tunics of the testis, such as, for example, adhesions, the substance of the gland itself is changed, the septa are much more apparent than natural, the seminiferous tubes appear to be less in number, are undoubtedly much reduced in size, and many become cords, instead of tubes.

WASTING OF THE TESTICLE.

Wasting of the testicle is another effect of inflammation in this organ; and this absorption of the gland takes place more frequently at the age of puberty, than at any other period. This is not unfrequently caused by a person receiving a blow on the part, from a ball, or cricket bat, from being thrown on the pommel of a saddle, or some such severe injury. The inflammation does however sometimes spontaneously occur, or without any obvious cause; and at others, though rarely, it is the effect of gonorrhœa.

Under these circumstances the testicle inflames, and swells to several times its natural bulk. It then begins to be absorbed as the inflammation subsides; but this absorption does not stop at the restoration of the testicle to its natural size, but it proceeds until the whole of the glandular structure of the organ is absorbed, leaving only the tunica vaginalis and the tunica albuginea, with its septa consolidated together; while the whole substance which remains, is not larger than the extremity of the finger, and it feels a firm and very solid body.

In such a wasted testicle in the collection at St. Thomas's Hospital, quicksilver would only descend into the vas deferens about half way between the abdominal ring, and the testis.

Mr. S———, at the age of 19 years, received a blow on the testes, from being thrown on the pommel of a saddle. In the evening of that day, eleven hours after, he was seized with excruciating pain in one testis, which continued to swell for a week, acquiring a great bulk; then the inflammation and swelling began to subside; but its decrease did not stop at the natural size of the testis, but the absorption proceeded, until the gland was removed. The spermatic cord was much smaller on the diseased side, than the other. The vas deferens could be perceived, but it was much less than natural. A small portion of the epididymis could be felt; but the testis was not larger than a pea when swollen by moisture. It was sensitive, but less so than on the healthy side. His constitution was scrofulous, for he had indolent enlargements of the glands of the neck. His virile powers, from his account, were not diminished.

A gentleman informed me, whose testis had wasted, so that only a small hard body remained in its stead, that he constantly felt pain in the part, if he were unwell from a cold, or other cause.

As these effects of inflammation of the testicle lead to the diminution of the virile power, or to the total destruction of the function of the organ, it behoves persons to carefully guard against its accession, and if unfortunately subjected to its influence, anxiously to endeavour to remove it immediately by every possible attention; for violent, repeated, and neglected attacks will be sure to be followed by a considerable diminution of the virile power, leaving the testicle lessened in its size, and in its capacity for secretion.

ON THE TREATMENT OF ACUTE INFLAMMATION OF THE TESTIS.

Suspension, or support of the part, should be the first advice given by the Surgeon in this disease, to which indeed the patient's own feelings, strongly prompt him. A suspensory bandage is to be applied, to receive, and support, the scrotum and testicles. It prevents the painful pendulous state of the testes, presses the blood from the veins, so as to assist its return, lessens the congestion in them, and tends to diminish the undue action of the arteries of the inflamed part.

But as the apparatus employed is usually but ill fitted to its purpose, I shall give some directions as to the best mechanical means which can be adopted for the perfect support of an inflamed testicle.

An elastic suspensory bag should be furnished with four tapes, two in front and two behind; the two anterior strings should be carried around the loins, and, crossing behind, be tied on the fore part of the abdomen; while the posterior strings, instead of being carried between the thighs to be fastened as they usually are behind, should be brought up in front of the groins, and there fastened to the anterior tapes, by which means the scrotum derives perfect support, instead of being drawn painfully backwards, as must happen by any other arrangement of the strings. A handkerchief doubled in a triangular form answers as an excellent substitute for the above described bandage: it should be furnished, however, with a tape sewn to the middle of its base, or long side of the triangle, which should be carried between the thighs and fastened, with the two long ends of the handkerchief, to a bandage previously placed around the abdomen; while the third angle is to be brought forward and upward in front of the scrotum, and also fastened to the circular bandage. I am not sure if this be not the most simple, as well as certain mode of securing support.

The following lotion is also to be directed :—

℞ Liq. Plumb. S. Acet. Dil. ℥vij.
Sp. Vini rect. ʒj.
M. ft. Lotio.

By the evaporation of this lotion, cold is produced, which diminishes the size of the inflamed, and dilated vessels ; by its astringency it contracts the scrotum ; and thus directly, as well as sympathetically, does this application powerfully assist in reducing inflammation.

Vinegar, or the Liq. Ammon. Acet., although good applications, if suffered to evaporate, are objected to by the patient, on account of their smell exposing him to observation ; and they do not answer the purpose better than the lotion I have mentioned. The Hydrochlorate of Ammonia in water, in the proportion of a dram to a pint, makes a very excellent application ; its evaporation producing cold, its gentle stimulus determining blood from the testicle to the scrotum, whilst it is free from any disagreeable smell ; a circumstance which in private practice is a matter of no slight consideration.

The Chloride of Mercury with Extract of Colocynth should be given at night, and a draught of Infusion of Senna with Tincture of Senna, and Sulphate of Magnesia, in the morning.

By this plan of treatment, the patient will generally, in a few days, have the more acute symptoms of inflammation removed. But if, notwithstanding these means, the inflammation continue, leeches must be applied. To this, the patient frequently offers objections, on account of the exposure it occasions in his family; if so, this inconvenience may be easily obviated, by drawing blood from the veins of the scrotum: the patient should be desired to stand before the Surgeon, who punctures three or four veins, with the point of a lancet introduced transversely with respect to the veins, from which openings they will bleed freely. Even if the lancet do not strike the vein, the scrotum will bleed, if the opening be sufficiently large, more especially, if the parts be placed in warm water; and so soon as three or four ounces of blood be drawn, the patient is to be directed to place himself on a couch in the recumbent posture, and the bleeding will almost immediately cease.

By this mode, the patient will lose more blood than several leeches would draw, and neither his bed-clothes or his dress will expose him to detection.

As in some cases, the inflammation will continue, notwithstanding the use of the means which I have pointed out, other directions may be still required.

The recumbent posture must be insisted upon, the effect of which is almost immediately beneficial; and its modus operandi is easily understood, by its directly withdrawing from the testis a large part of its blood. Whoever has opened the veins of the scrotum in the erect position of the patient, and has seen how soon and suddenly the bleeding from them ceases as he becomes recumbent, will be fully sensible of the effect of gravitation upon the testicle, in accumulating blood in its vessels. But it is not merely the removal of congestion in the veins, but the action of the arteries is also diminished; because they have no longer the column of venous blood to overcome, in returning it to the heart.

The recumbent position, however, does not preclude the necessity of support of the testis in a handkerchief; for the scrotum should be raised towards the abdomen, and not be suffered to fall between the thighs, which, if permitted, will destroy the salutary influence of the recumbent posture.

Fomentations and poultices are now the best applications; for the means employed having relieved the great distension of vessels, the consequent relaxation does no injury; but in fact the perspiration which the fomentations produce, assists to relieve the vessels, by unloading them of the more watery parts of the blood.

The absorbent vessels, stimulated by the heat of the fomentations, are excited to remove what has been effused by the inflammatory process.

The poultices should be thin, as otherwise, the patient never fails to complain of their weight. As to their material, it is of little importance; for it is their warmth and moisture which are beneficial; and bread and milk, or bread and water, linseed meal and water, oatmeal and water, will each effect this object, equally well.

If the inflammation continue, local bleeding may again be had recourse to; and I have several times seen it absolutely necessary to open a vein in the arm, and bleed largely, before the disposition to inflammation could be subdued, and even to repeat venesection. Emetics in this stage of the disease are very useful, and nauseating doses of Tartarized Antimony powerfully aid, in subduing obstinate inflammatory action.

It is, however, proper to state, that there are some very irritable persons, in whom the continuance of depletion will not succeed; and the best practice, when the pulse is jerking, the patient irritable, and the part painful, is to give the Chloride of Mercury with Pulvis Ipecacuanhæ Compositus, which lessens the irritability of the system, restores the secretions, and often subdues an irritable inflammation, when evacuations of blood and purging cease to produce any salutary influence.

When the inflammation proceeds to suppuration, fomentations and poultices are the best mode of treatment, and leeches may be still applied, because the extent of suppuration is lessened by their means; but so soon as the matter can be perceived, it should be discharged by the puncture of a lancet, as otherwise the secreting substance of the testis is destroyed, and the abscess discharges itself, by more than one aperture; for the tunica albuginea being long in ulcerating, much time, and destruction of the part, are saved the patient, by an early opening. Frequently the abscess is in the testis itself, often in the epididymis, and more than once, I have seen it produced, in the spermatic cord. The opening which is made for its discharge, must be sufficiently free for the easy escape of the matter, or the swelling will not decline.

ON THE MEANS OF REMOVING THE EFFECTS OF INFLAMMATION OF THE TESTICLE.

The local applications required for the enlargement and thickening which remain when the inflammation has subsided, are poultices of vinegar and oatmeal, or a lotion of Hydrochlorate of Ammon: and vinegar, mixed with bread.

The Ceratum Saponis, the Ung: or Liniment Hydr:, or rubbing upon the part some Iodine Ointment, is also useful.

A most excellent and cleanly application is oil silk, which promotes a free secretion from the scrotum, and unloads the arteries of the part: the suspensory bandage may be either formed of this material, or it may be lined with it.

The Emplastrum Amm: cum Hydrarg: may be advantageously worn, on account of the stimulus it gives to the absorbent vessels. The Tincture of Iodine may be applied upon the scrotum, either for the purpose of checking the disease or of removing its effects; and the Pyroligneous Acid is a powerful irritating application.

The best constitutional treatment is to give small doses of the Bichloridum Hydr:, or Pil: Hydr: gr. ij, Ant: Tart: gr. $\frac{1}{4}$, or Extract: Coloc: Comp: gr. iij, with Ipecacuanha, gr. ij, made into a pill, and taken each night; and if the latter should nauseate, so much the better, as the state of nausea, powerfully promotes the action of the absorbent vessels. The Liquor Potassæ is also a good medicine. I have known the enlargement of the epididymis yield to the Pil: Hydr: Sub: Comp: and the Compound Decoction of Sarsaparilla, under a three months' continuance of them.

The Tincture of Iodine is useful, but its effect ought to be carefully watched; for I have often seen it, when given internally for a length of time, produce great derangement of the system, and disorder of the stomach, and bowels.

The Tincture of Digitalis, in cases which obstinately resist the means I have mentioned, deserves a trial, on account of its powerful influence on the absorbent system.

Certainly the most powerful means of exciting absorption, consists in promoting nausea, as I have already stated.

Electricity is sometimes recommended, to remove the hardness of the epididymis; but I have never witnessed much utility from its influence.

Where inflammation and adhesion have occurred in the tunica vaginalis, it is not desirable to use any active measures, as they will do but little in removing the adhesions; and they are not of sufficient consequence, to justify the use of powerful remedies.

If irritation, or stricture in the urethra, has been the cause of inflammation in the testis, when the acute inflammation is removed, it will be proper to begin its treatment; but not until then, should the use of bougies ever be had recourse to.

CHAPTER III.

OF THE SIMPLE CHRONIC DISEASES OF THE TESTICLE.

THIS disease, although of very frequent occurrence, has often been confounded with those of a malignant nature. It begins in a hardness and swelling of the epididymis; is at first unattended with pain, and is frequently discovered by accident, even after it has acquired considerable bulk. Gradually increasing, yet still unaccompanied with pain, the testicle at length becomes involved in the disease. The form of the epididymis is preserved, although its size is augmented; and its separation from the testicle may still be distinctly traced. The latter, when enlarged and hardened, generally retains its natural smoothness of surface, but its form is more than usually rounded.

Water is effused into the tunica vaginalis in many of these cases, and the serum is clear and transparent. The health of the patient appears to be but little affected; and he is capable of taking exercise, and of pursuing his business or amusements, without interruption; yet, there is generally in chronic diseases, a fault in the constitution, and it will be found that some of the patient's functions are imperfectly performed, and his secretions defective.

The part is indolent, and the patient perhaps handles it, from its insensibility, with a degree of roughness, which surprises the Surgeon.

Each epididymis and testicle is frequently cotemporaneously affected; and hydrocele often exists on one side, but not on the other, yet it sometimes appears on both sides.

Sometimes one testis will cease to swell, and the other then become enlarged. The testicle and epididymis continue smooth under great increase, and the spermatic cord is not usually hardened; but its veins are a little swollen, and it is consequently somewhat increased in size. When the enlargement in the testis and epididymis is considerable, slight pain, and a sense of weight, are complained of, in the loins, and thigh.

In the state I have above described, the testicle may remain for months requiring support, but in other respects receiving no kind of attention; but from catarrh, a slight blow in riding on horseback, some indiscretion in drinking, or some other excess, it becomes additionally swollen, attended with great pain in the part, and loins, with swelling and redness of the scrotum, which admit of relief from leeches, and purging; but in a few weeks, on returning to exercise, and the usual mode of living, the disease becomes again suddenly augmented, the same symptoms recur, and a similar treatment is required.

A frequent repetition of such attacks exposes the patient to so much inconvenience, that many express an anxious wish, that the part should be removed.

Sometimes a suppurative inflammation succeeds; attended with great pain, redness of the scrotum, and an obscure fluctuation, which indicate its presence; and the matter can usually be felt at the extremity of the epididymis, or in the testis; and if it be punctured with a lancet, a thick ill-formed pus is discharged.

Pus is sometimes formed in the body of the testicle; and then its progress to the skin is extremely retarded, by the little disposition to ulceration, which the tunica albuginea testis, is ever sure to manifest.

From this condition a sinus, or sometimes several sinuses, are produced, from which a seminal fluid is discharged, which stiffens the linen, and retards, if not prevents, the sinuses from healing.

During the progress of the suppurative inflammation, a hydrocele is sometimes formed in the tunica vaginalis; and it generally, or at least frequently happens, that the fluid produced under these circumstances, is coloured by the red particles of the blood.

OF THE GRANULAR SWELLING OF THE TESTIS AFTER A CHRONIC ABSCESS.

From the cavity of the abscess, whether it spring from the epididymis or testis, and frequently from the latter as well as the former, granulations arise; and as they grow, being compressed as they are by the unyielding nature of the tunica albuginea, they protrude through the ulcerated opening of the tunic, and form a granulated swelling, which is often seen on the scrotum. The cause of this apparently exuberant growth is the same as in the granular swellings of the brain, which so frequently succeed a wound of that organ, from the bones of the skull, and the dura mater, compressing the swollen part.

This granular swelling from the testicle, has been often mistaken for cancer, or fungus; but it has nothing malignant in its nature, for it may be cured by such local applications as do not disorganize it; nor does it produce any disease of the absorbent glands, either of the groins or of the loins.

In short it is formed of common granulations only, which become exuberant, in consequence of their being pressed from the inner side of the abscess by the tunica albuginea. It requires, however, a peculiar treatment for its cure; although I have seen it yield to different applications, and to varied modes of relief.

Before this disease was well understood, I have several times known the testicle unnecessarily removed; sometimes, however, from the patient's own request, from the frequent return of the disease, as happens, when the inflammation is only partly subdued. The extirpation of the testicle may, however, become necessary, when the patient's constitution begins to give way from continued irritation, and quantity of discharge. Some persons also submit to the operation, rather than to the protracted inconvenience, arising from the disease.

DISSECTION OF THE CHRONIC DISEASE OF THE TESTIS, AND OF THE GRANULAR SWELLING.

When a testicle is removed during the adhesive stage of the disease, the appearance of it, and of the epididymis is changed into a general yellowish white aspect, possessing considerable solidity.

On making a section of a chronic enlargement of the testis, and throwing it into water, by agitation, a whitish yellow fluid proceeds from the seminiferous tubes, which are extremely dilated, and which then appear emptied. But still the same bulk of testicle remains, owing to the cellular membrane of the part being loaded with a yellow fibrine, or coagulable lymph; the rete is filled with the same secretion as the tubuli; the epididymis is similarly diseased, and sometimes the vesiculæ seminales and vasa deferentia are distended with this morbid secretion. But the effusion, whether placed in the one situation or in the other, when it becomes absorbed by proper treatment, may, and apparently does, leave the testicle, still capable of performing its functions, and allowing therefore of its complete recovery.

[See Plate i and ii, Part II.]

Sometimes in dissection, we meet with an abscess or abscesses in the testicle, and epididymis, connected with the adhesive, or fibrous effusion ; and this combined with more or less of ulceration, so that a part of the testicle is destroyed, and the complete recovery of its function is rendered impossible. Several abscesses are sometimes found in the same testicle.

It is not very uncommon to find sinuses or fistulæ leading from the cavities of these old abscesses, to the external surface of the scrotum, and as the testicle thus diseased, still secretes some semen, both the cavities and their outlets are prevented from closing, until the secreting surface be healed, or destroyed.

When the *Granular Swelling* is produced, the granulations are found by dissection to spring from the seminiferous structure : they are projected through the ulcerated coverings of the testicle or epididymis, but more frequently of the former ; and this hernial granulatory protrusion, produces the swelling, which is so often seen in chronic abscess of the testicle.

The various states of the testis being thus ascertained by dissection, the Surgeon is relieved of much of his difficulty in the treatment of its disease under similar circumstances.

CAUSES OF THE DISEASE.

With respect to the causes of chronic inflammation, it is wrong to view it merely as a local affection, for there are persons prone to this complaint from a constitutional tendency to the malady.

It often occurs in those who have been scrofulous in their youth. It is frequently the product of a constitution, worn, and broken down by intemperance. It often follows a long continued course of Mercury; and it arises in habits, in which, the vital powers are diminished, and in which, we so often find also sloughing of the cellular membrane, in the form of chronic carbuncle.

Frequent exposure to wet, cold, or fatigue, and an excessive indulgence of the passions, also dispose to the production of chronic testitis.

The most frequent occasional cause is urethral disease, but whether it be irritation only, exciting a sympathetic influence, or an organic change in the mucous membrane, it is difficult to discover. Many of those causes which I have mentioned, in speaking of acute inflammation of the testes, are, in different cases, the precursors of this disease; the chief difference in the nature and production of the two complaints, being in the state of the constitution.

OF THE TREATMENT OF CHRONIC INFLAMMATION OF THE TESTIS.

It too frequently happens that mistaken opinions are formed of this complaint, and that it is viewed as a malignant affection, requiring to be removed by an operation. But that this disease has nothing of a dangerous nature in its consequences, except as regards the part itself, is proved, by its never seriously affecting the glands of the loins, or groins, or proceeding further, than to disorganize the testis itself.

In its adhesive stage, when a solid effusion has been produced in the tubes, and even in the substance of the testis or epididymis, the following treatment will succeed in removing it; and when properly stated to the patient, that the testicle will be sacrificed to his refusal, he usually most readily consents to the plan recommended.

The recumbent posture for a month should be steadily maintained.

Nor should the patient be content with reclining only; but the body should be so recumbent as to prevent any gravitation of blood into the testis.

Patients suppose they do enough, if they sit with their legs placed horizontally before them; but this position is, at least, quite as unfavourable, as the erect posture.

The medicines I have found most efficacious are as follow:— ℞ Chloridi Hydr: gr. iij, Opii gr. j, M. ft. Pilul, nocte maneque sumenda; and it is desirable that the Mercury should affect the gums, and that influence be continued for a month at least.

Every fourth morning the following aperient will be advisable:—

℞ Inf: Sennæ ℥jss.
Tinct: Sennæ ʒj.
Mag: Sulphat: ℥ss.
Liq: Ant: Tart: g^{tt} xv.
M. ft. Haust.

Such is the plan which constitutes the best constitutional and general treatment; while the application of leeches twice a week, frequent fomentations, and the use of the following lotion to the scrotum, are to be the local means employed:—

℞ Liquor: Amm: Acet: ℥v.
Sp: Vini rect: ℥j.
M. ft. Lotio.

Or equal parts of Camphorated Mixture and Vinegar produce an equally good effect.

By this plan, perseveringly followed for a month or six weeks, the complaint rarely fails to yield, without leading to the suppurative inflammation; and I therefore, from experience, speak with great confidence of the result.

When the disease is sympathetic with the urethra, it will be proper, before the patient quits the recumbent posture, that bougies should be employed, if the stricture be considerable; but if it be accompanied with irritability of the urethra only, or even with slight stricture, it is best to depend upon the above treatment, without the use of bougies; as it often happens that, by its constitutional influence, it not only relieves the urethra, but cures the diseased testis, without the risk of producing more local disease, which bougies often occasion.

The following are examples of the result of the mode of treatment, which I have advised, and of which many more might be adduced.

CASE I.

A gentleman had a hydrocele and enlarged testicle. He consulted a Surgeon, who attempted to tap him, but punctured the testis, and concluded therefore that he had been mistaken in the nature of the case, and advised the removal of the testicle. The patient, however, consulted another Surgeon, who ordered a course of Mercury to be adopted, by which the enlargement of the testicle was subdued, when the hydrocele was again tapped, and ultimately cured by injection.

CASE II.

An officer of the British army, of considerable rank, was attacked with inflammation of the testis at the time when he was in the Peninsula. He suffered constitutionally from fatigue, exposure to vicissitudes of temperature, and irregular living. Unsuccessful attempts were made to cure the disease; and it being concluded to be malignant, the testis was removed, and he soon recovered.

Some time after the remaining testicle became swollen; and the symptoms being similar to those of the previous disease, he became exceedingly alarmed, and placed himself under the care of Mr. Rose, who requested to have a consultation with Sir Everard Home and myself. We found the testis hard, swollen, yet but little painful; and every evidence of his general health having greatly suffered from climate and fatigue. He was directed the plan which I have recommended; and Mr. Rose informed me, that in a few weeks he perfectly recovered: and as the other testicle had been affected with precisely similar symptoms, it is fair to conclude that it also might have been saved; for many testes, condemned for removal, I have thus known preserved.

But when the testicle has proceeded to suppuration, however small the quantity of matter which may be produced, although for a time the symptoms may yield to the above proposed plan, if steadily pursued, yet when the patient resumes the erect posture, and gives up Mercury, he is liable to relapse, and thus several times disappointed, at last becomes anxious for the removal of the part.

CASE III.

A Surgeon in the Cavalry had an inflammation and chronic enlargement of the testicle, which had been repeatedly relieved by the recumbent posture, local depletion, and the use of Mercury; yet when he returned to the exertions necessary to the due performance of his military duties, the symptoms were renewed. Tired by these repeated disappointments, and unable to pursue his profession satisfactorily to himself, he requested me to remove the part, to which I consented, and found, upon dissection of the testis, a chronic abscess in its centre, which kept up irritation of the part, and repeatedly reproduced the inflammation.

OF THE TREATMENT OF THE GRANULAR SWELLING.

When the abscess is followed by a large, and exuberant growth of granulations, from their great elevation, the skin cannot heal over them; and although the constitution may be improved, this local impediment to their cicatrization, still exists. It therefore becomes necessary by some means to bring the granulating surface even with the skin. To effect this object, the Surgeon has recourse to pressure, by dry lint and by adhesive plaster bound around the scrotum, which necessarily checks the growth of granulations, and gradually diminishes their size.

In cases in which pressure will not succeed, I have seen the Sulphate of Copper powdered, and daily sprinkled upon the surface, remove the swelling. Powdered Alum, is also a good application, as it constringes the vessels upon its surface, and thus gradually diminishes the new structure, which I have also seen effectual in other cases. Lord G. B—— came to London with an ulcer, accompanied with fungous granulations, growing, like a polypus, from the inner side of his nose, and supposed by some excellent Surgeons to be malignant: by the daily application of powdered Alum, introduced by a camel's hair pencil, it gradually disappeared, without pain or inconvenience. The Nitrate of Silver applied in powder in the same way, sometimes succeeds in removing this unnatural growth. Arsenic is also sometimes recommended for this purpose, but I have known Arsenic, applied in powder over an extensive surface of this species of swelling, destroy life, by its action upon the stomach and nervous system; and cannot neglect this opportunity of observing, that it is a very dangerous application, upon granular surfaces of great extent, which often prove too ready absorbent surfaces. I once saw it applied in solution upon a fungous disease of the eye, and it destroyed the life of the patient, by producing inflammation in the stomach. In this granular swelling I have several times successfully practised the following plan; making an elliptical incision through the skin around the projecting granulations, and then carrying the knife under the whole of the swelling, close to the tunica albuginea, have excised the granulations, leaving the epididymis and testicle uninjured. The edges of the skin are then approximated over the new surface, and it is healed, if possible, by adhesion; but even if the adhesion be not complete, by pressure with adhesive plaster, and by approximation of the integuments over the orifice of the tunica albuginea, the granulations are prevented, from becoming again prominent. It is scarcely necessary to remark, that this operation must be preceded by proper constitutional treatment.

In 1802 I attended, with Mr. Addington, in Spital Square, a granulating swelling of the testis, which rose about an inch above the level of the scrotum. I passed two ligatures through the edges of the skin, at the circumference of the swelling, and carried them through its base. I then cut off the granulations even with the scrotum, and brought the edges of the skin over the new surface, and the patient soon recovered; and I have since several times succeeded in producing a cure by a similar operation.

But if this swelling be very large, and the testicle greatly reduced, it is best to remove the gland, and thus to save the patient, a very protracted disease.

When abscesses have formed in the testicle, or epididymis, sinuses follow, which are difficult to heal; in these cases, besides following a constitutional plan by giving Calomel, and Opium, as well as observing the recumbent posture, it is right to inject a solution of the Sulphate of Copper, or Bichloride of Mercury, into the wound, as well as to apply it upon the surface. In an obstinate case of this kind, in which the abscess began in the globus minor of the epididymis, a deep incision, was successfully made, to divide the vas deferens, and thus to prevent the continued secretion of semen from the orifice, and to lead to the closure of the fistula.

In the following Case this object was effected by a seton.

CASE I.

A gentleman came to me from Hull, in Yorkshire, who had a gonorrhœa seven years ago. Five years since, his left epididymis began to swell, and soon after the right. Both proceeded to suppuration, and ulceration; and the gentleman who attended him, finding much difficulty in closing the openings, passed a seton through each sinus, and they both readily healed. A hard swelling remained, however, at the globus minor of each epididymis. In coition ever after, he had the sensation of emission, but no discharge of semen. The patient was married, but his wife has not been pregnant, although he retains both the capacity and inclination for sexual intercourse.

The testes continue nearly of their natural size.

CASE II.

Mr. H. has had an abscess in each testis; one has healed, the other remains. The disposition to cohabit continues, but the quantity of semen emitted is much less than natural.

When the operation of removing the testis is required for a chronic enlargement, the patient may be assured that the operation, with subsequent attention to the general health, will free him from future disease, for although the vesiculæ seminales may have become affected with the consequent effusion, I have never known any inconvenience arise from it after the testicle had been removed; and probably it becomes absorbed upon the restoration of the constitutional powers.

CHAPTER IV.

ON THE IRRITABLE TESTIS.

THIS is a most distressing complaint, and extremely difficult of cure. Its presence is marked by the following symptoms:—

The patient has an unnatural sensibility, in a part or whole of the testicle, or epididymis; it is extremely tender to the touch, rendered more painful by exercise, and morbidly sensitive at all times.

Its sensibility becomes occasionally so much increased, that the slightest touch produces exquisite suffering: and the pain extends to the back and groin. The motion of the testis, and the slight pressure it receives from the clothes during walking, produce so great a degree of pain as almost to preclude the possibility of exercise; and the patient is obliged to seek relief, by continually lying upon a sofa, or by remaining in bed. The testicle is but little swollen; generally it is not equally tender in every part, but there is a point in which the morbid sensibility, particularly resides. The epididymis and spermatic cord, also suffer from similar sensibility, and if the part be not supported, the pain is scarcely tolerable; and even in the recumbent posture, the patient is obliged to place himself on the opposite side to the disease, to obtain mitigation of his sufferings. The pain is felt in the groin and thigh upon the diseased side, and the testicle appears fuller, and more loaded on that side, than the other. Motion, in most cases, produces not only pain at the time, but much increased inconvenience for some hours after; the tenderest manipulation in examining the diseased part occasions great uneasiness, and leaves the testis additionally sensitive. The stomach is usually rendered extremely irritable, sometimes even to the degree of occasioning vomiting.

This disease is sometimes protracted for weeks, months, or even for years; and if at any time the patient believes that the sensibility is somewhat diminished, and that he may venture upon slight indulgence, the want of precaution, in position, or exercise directly renews all his former sufferings.

The complaint occasions in some instances, so much distress of mind, so great a degree of bodily suffering, and so completely incapacitates its victim from amusement, and the pursuit of his profession, or business, that he voluntarily seeks relief from an operation, which I have been thrice compelled by my patient's own request to perform, yielding to their wishes, rather than recommending it, upon my own judgment.

But so much better is a disease understood, when exemplified by cases, drawn up by patients themselves, and containing their own minute and feeling detail of circumstances, that I will insert the following letters, which so graphically describe the sufferings of the writers.

Extract from a Letter, dated September 13, 1817.

" Since I had the pleasure of seeing you, I have still continued to maintain an alternate state of amendment, and relapse, such indeed as has existed for the last eight months.

" For the last eight or ten days I think I have enjoyed more comparative ease than I have done for the same length of time, perhaps during any period of my very protracted illness; and this I attribute to the almost constant application in the daytime of a bladder containing a Solution of Nitre in cold water, holding likewise an additional quantity of the salt dissolved than what was recommended. I have applied about eighteen leeches once every week, and sometimes twice, and almost uniformly with benefit.

" The last bleeding happened on Thursday se'nnight, and I was pretty easy next day, and on Saturday, till four o'clock, p. m. when the pain, heat, &c. came on with increasing violence, and in such a way as I have formerly observed, and it continued for some time with undiminishing severity. I thought then of the bladder with Nitre, and had recourse to it, with consecutive benefit, in the course of from a quarter, to half an hour. My idea is, that the cold is kept up by the solution of the salt going on in the water, when in contact with the side. There is evidently less swelling in the iliac region, and the pain has been much less there, and in the small of the back. I am still sensible, however, of considerable fulness in the site of the blow—that is, where the spermatic cord crosses the pubes, where likewise I have much pain whenever the testis is not properly supported, or when it is accidentally moved in any way. The testis is likewise tender to the touch, especially towards the epididymis, and between the latter, and the seat of the injury just mentioned; but I am not sensible of the pain extending to the testis. Anxious as you will easily suppose I am to get to business again, I have been trying for some days to walk a few yards in the garden. I am sorry to say I cannot do it without adding to my suffering; but on coming in, I immediately lay myself on the sofa, and have the cold applied, and thus the increased pain sooner abates than it formerly did, when similarly affected. I keep my bowels regular; I continue the cold hip-bath; and dare not therefore venture on the Hydrarg: cum Cret: you kindly suggested, which otherwise I think I might have taken with advantage. My general health and appetite remain good. I have an intention of applying some leeches again in a few days, and following it up immediately with cold.

"I am, my dear friend, becoming very anxious to get on foot again. I am better, upon the whole, than I was when you were with me; but, after so many irksome disappointments, dare not indulge a too fond, or flattering anticipation. I cannot but look at the period as yet far distant when I am to be well, if ever that period will arrive: I shall, however, wait with all the patience I can command, and hope that things may turn out even better than my expectations."

Extract from a Letter, dated January 19, 1818.

"The Solution of Nitre in a bladder, like some other remedies, proved of use for a time; but it at length ceased to communicate ease, and a strong Solution of the Hydrochlorate of Ammonia, Ice, &c. have in their turn, been of service, and then failed; and after many alternations of amendment, and relapse, of some days' duration, I am just, where I was ten, or twelve months ago.

" I have named the propriety, or possibility, of dividing the nerve included in the spermatic sheath, without injury to the testis, vas deferens, or other vessels. I am somewhat dubious as to its practicability, as well as in regard to the certainty of its bringing relief, since it is not impossible that the nerve higher up in its course than the ring, may be in a diseased state: but you have kindly expressed a wish to have an opportunity of naming the case to ——; and if I were able to draw it up more fully than I can on the present occasion, perhaps you might still incline to hear his opinion.

" Probably this disease is seated in the nerve of the spermatic cord, and perhaps also in the plexus which surround the arteries; in which case you know the operation could not be of much service. To this conclusion I have the more decidedly come, from the circumstance that the pain is of a numb pricking kind, answering to that proceeding from a compressed or irritated nerve, and that it is uniformly increased by whatever disturbs the position of the testis, or presses upon the ring, or the course of the cord. I can bear the erect position for a short time, that is, for a few minutes, without my suffering being much increased, provided the testis is properly adjusted, and there is no pressure or irritation applied to the iliac, or pubic regions of the right side. When I lie on the left side, the pain is of the dragging kind, as if extending from the region of the cæcum coli, towards the part where the injury on the cord was inflicted, as it crosses the pubes; whereas, when on the right side, it is more sharp, and feels as if some part, which is tender and sore, were pressed upon, by those in its neighbourhood. I feel most ease, therefore, when I lie on my back, the testis being well adjusted, and pressure of the bandage removed completely from the side. There is considerable fulness or thickening on the side of the pubes in the site of the injury, which is always increased, and extends higher up in the direction of the cord, when the pain has been greater for a little time; but the fulness and tension in the right iliac region, upon the whole, has been less for two or three months.

" After medicine, which has by its action produced two or three stools, I have uniformly suffered more pain for a day; and the passage of the flatus through the cæcum is attended by a somewhat similar effect, though of much shorter duration. On examining the cord as accurately as the tender state of the part will allow, it appears to be free from disease; and the testis, which, however, hangs lower than the other, excepting its greater sensitiveness on being handled, seems to remain unchanged in size, and structure.

" My general health continues good, and every function natural.

" My urinary organs are perfectly healthy; and I may remark that when the penis is erected, I am much freer from pain, probably in consequence of the contracted state of the scrotum, that takes place at that time, supporting the testes. This is a crude and hasty sketch ; but from it you will be enabled to collect the particulars for your own arrangements.

" The distance of time between the accident and my beginning to suffer much, with the exception of an occasional pang once or twice in a month, was about eighteen months ; and the length of time I have now been confined, almost entirely to the horizontal position, is more than a year.

" I am at present using only the hip-bath twice a day, and ice two or three times in the interval, when I can get it. In the hope of hearing from you,

" I remain your's faithfully.

" N. B. It has always happened that, however severe the pain has been in the side, and right lumbar region, that it has given way when cold had been applied to the abdominal ring, and right pubic region, for a short time; and comparative, if not entire ease, will be enjoyed for almost an hour, and sometimes longer, after the cold has been taken away."

Extract from a Letter, dated November 1, 1822.

" Dear H.

" I am again about troubling you with a long account of my complaint, which I fear will tire your patience to read.

" After leaving you in London, I proceeded to Liverpool alone in my carriage—the heat intolerable; and though I travelled slowly, and was two nights and near two days on the road, strange to believe, I felt greatly better than when I started, and the part complained of, became reduced to its natural size; so that travelling, and having plenty of room, clearly agreed with it. But this unexpected relief was of short duration after I got to my journey's end.

" I commenced sea-bathing when I got home, and continued it during the summer; and I have also continued to take the Decoction of Aloes, &c. almost every night since I left you, which keeps my bowels in excellent order; yet tearing off the plaster when I bathed, seemed to do as much harm, as the bathing did good. Though not so well by any means as I was a month ago, yet I have great pleasure in telling you that I am greatly better than when I last saw you. Thank God, I can now walk four or five miles a day without much inconvenience to myself, except a day or two about once a month. I continue to live precisely as I stated to you before, except that since my return, I have only taken about one and a half, or two glasses of Madeira wine in twenty-four hours, instead of brandy; and if you think it would not be injurious to me, I would also leave off wine. I have greatly lessened my bulk, by curtailing my food; and I think I am the better for it, feel lighter, and much more comfortable; I cannot say that I find my constitution suffer from so long a continuance of the Decoction of Aloes.

"I have lately but seldom experienced the unnatural emissions I complained of to you, certainly not more than once in a month, or six weeks. I applied the plaster recommended by —— when I returned home, and bathed in the sea, but it would not adhere to the part; it seemed to relieve me more than the other plaster, but in a little time it made the skin so tender and sore, that I feared it would remove it, and cause ulcers: I was therefore soon obliged to discontinue it. I seldom use the testicle, as it seems to irritate it, and make it tender for a day or two afterwards; yet it seems to relieve it at the moment, and for two or three hours after doing so. When I touch with my finger the vessels attached to the upper, and outer quarter of the testicle, it feels tender and sore, even now that I am so much better than I have been; so that the disease seems to be more in those vessels, than in the testicle itself.

"I think I was right in saying there was an irritation in the testicle; and if I can judge from my own feelings, I certainly think, as I have done all along, that there is something amiss in the seminal passage about the testicle; but of this, you will be the best judge.

"I do not suffer near the inconvenience I did in using the testis; though when I do so, even at present, I find it necessary not to take any exercise on the following day. This is hard; but it is sinful to complain; and I am truly thankful to God for being so well as I am.

"I shall not use the opening medicine recommended by ——, till I hear from you in answer to this, as I find it inconvenient, from the want of a tepid bath (the nearest being ten miles from hence); and if I get one fixed in my own house, I do not know the necessary heat, nor how often to use it, without your directions.

"Six weeks ago I thought I should be able to give you a much more favourable account of myself than I now can.

"Were it not from the inconvenience and soreness, nearly approaching to pain, I feel in the upper and outer part of the testicle, and in the vessels attached to it, for some days after using it, my mind would be greatly easier than it is; but while these unpleasant sensations remain, I cannot divest my mind from the apprehension of danger, notwithstanding your opinion, and Mr. ——'s to the contrary. I have, I believe very foolishly, conceived a course of Mercury would greatly relieve me: to this I would most willingly submit, if there was a chance of good by it. Now, my dear friend, will you have the goodness to turn once more over in your mind my case (I believe a singular one); and if you think it would answer any good purpose to see —— again on the subject, I shall feel for ever obliged to you, for doing so. Yet I think he has given my case his best consideration, and made his mind up concerning it.

"To me, it is most extraordinary I cannot get well of the complaint, when I consider, I have had the best advice in Europe: a complaint too, in their opinion far from hopeless; by an abstemious mode of living my health, in every other respect, was never better, nor even so good; and my constitution excellent.

"I shall anxiously look for your answer, and remain,

"Dear ——,

"Ever sincerely your's.

"On further consideration, I think you had better not consult Mr. —— again on my case: his medicine I look upon as having failed, in eradicating the disease; it only relieves it. I would rather look to ——'s advice in future. Pray tell me as soon as you can, if there is any danger in taking the medicine ordered by him, at this season of the year."

Extract from a Letter, dated November 7, 1822.

" Dear H.

" I stated to you in my last letter, sent from hence about five or six days ago, that —— observed there was an irritation in the testicle; and if I mistake not, he recommended me at that time to try the effects of medicine before I left London. I am sorry now I did not take his advice, as I find the medicine recommended by Mr. —— will not eradicate my disease; but having a very high opinion of Mr. ——'s skill, by his successful treatment of a very bad swelled testicle I had ten or twelve years ago, I persisted in following his advice till now.

" I have a great desire to put myself under the care of —— for some weeks, and go to London for that express purpose, (though expensive and inconvenient for my doing so), to try what he can do for me (if you would recommend my doing so at this season of the year), as I feel extremely uneasy, and anxious to get rid of this stubborn, and I fear dangerous complaint; and I do not by any means like to put myself in the hands of medical men here, while it is in my power to avoid it.

" I will now state to you some further observations of my own, in addition to what you already know. I think I can trace back the origin of my disease to the Spring of 1817, about eight or nine months before I married (in the beginning of 1818). I at that time, 1817, lived too well, grew very corpulent and bloated, took little exercise, and did not cohabit with women during the above eight, or nine months, as I had previously been in the habit of doing, when on shore. Before the complaint began, I had, during my hours of rest, violent erections; so much so, that I felt the testicle and the vessels now complained of, as if ready to burst, until I got up and walked about for some time, when the uneasiness subsided. Soon after I married, I began to feel the symptoms you are acquainted with; and in a few months I became so uneasy as to cause even some trifling pain when discharging the testicle; till at last it grew so very bad as to greatly alarm me, and I was under the necessity of going to London for advice.

" From the period of my return home in June last, until about a month ago, I gradually improved, not having used the testicle for the three previous months to October. About three weeks ago I used it, which seemed to relieve it; but it caused a trifling tenderness, and an additional swelling of the testicle for three or four following days. About eight days since I again used it, hoping at the time I should be able to continue doing so; but in this I was disappointed, for on the first day it felt tender, and increased in size; second and third days still more so, with considerable uneasiness; so that, to my mind, using it clearly irritates it, so as to cause the swelling above alluded to: and the upper and outer part of the testicle, and vessels attached to it, become very sore, even when slightly touched with the point of my finger. As the swelling diminishes (after using the testicle), the tenderness to the touch in a great measure subsides.

"I remain
"Very sincerely your's,
"J. Q."

Extract of a Letter from Sunderland.

"My dear Sir,

"I am suffering from an uneasiness in the testicle, but still more from pain in the spermatic cord, where it passes down by the groin; and it is there somewhat enlarged. I have called upon Dr. ——, who said it did not appear to him that there was any thing the matter with the testis: he gave me an aperient medicine, and a lotion of a stimulating quality, under the use of which, the uneasiness subsided for several days; but when I returned to exertion, more especially to walking exercise, the enlargement, as well as the uneasiness, recurred, and exercise of every kind produces the same effect. I suffer no pain when I am in bed, or sitting still. I am very much troubled with flatulency, which produces pain about the lower region of the stomach; and may have pressed against the cord in the groin, so as to have added to the suffering there.

"Another cause to which I have attributed the uneasiness I have experienced is, that I have long worn a truss, or bag with two strings, which press lightly upon, and over the testes, and may have done me injury.

"My general health and strength, in other respects, are improving fast; nor does the pain I now experience affect me otherwise than that I feel apprehensions, which check every pleasure; and I request the favour of you, at your earliest convenience, to give me your best opinion.

"Should I take exercise?

"Will bathing the part in cold salt-water be useful?

"Shall I drink wine?

"I may add, that I sleep remarkably well, and generally ten hours. My appetite is very good; I do not feel feverish; but my tongue is generally white and furred in the morning.

"I am your's truly,

"T. S."

ON THE CAUSE OF THE IRRITABLE TESTIS.

As this disease is not of an inflammatory nature, for there is rather a diminution, than an increase of arterial action in it; and as the part is but little, if at all swollen, and the increased sensibility is not of that nature which attends common inflammation, in which there is a great determination of blood to the part; I am inclined to believe that the disease is seated in the nerves, and that it is of the nature of tic douloureux, in which complaint the nerves are in a state of altered action, rather below, than above par; and this is evinced by its being frequently the precursor, often the attendant, and sometimes the successor of paralytic affections. It is also proved by the fact, that almost all the best remedies for it, are of a stimulating nature. I know of no person in this country who has dissected a nerve affected with tic douloureux but Mr. Thomas, the present President of the Royal College of Surgeons; and he examined the infra-orbitary nerve, and found it, in no respect differing from the nerve of the opposite side.

This nervous irritation has sometimes a local origin only, as in the extremity of a limb, which has suffered amputation.

It is frequently constitutional, from the nervous system being generally deranged; and it is sometimes sympathetic with disease of the brain and its membranes, as in the case of Dr. Pemberton, in whom a piece of bone in the dura mater was found to have been the cause of the dreadful irritation in the nerves of the face.

In the irritable disease of the testicle, dissection teaches nothing of its nature, excepting that it is not inflammatory, and ought not, therefore, to be treated by general depletion, although leeches, and local evacuations, may for a moment relieve it.

I have dissected all the testicles which I have removed for this complaint; but there was no apparent change of structure, in any of them.

The digestive functions are in these cases often impaired; but this is the effect of the deranged state of the nervous system, and not the original cause of the disease: nor is the disease permanently relieved by any attention to diet.

OF THE TREATMENT OF IRRITABLE TESTIS.

Two principles should guide the Surgeon in his treatment of this complaint; the one, is to increase the tone of the nervous system, the other to allay the irritability of the constitution, and secondarily of the part: and these two objects are to be effected by general, and by local means.

The various medicines by which the first object should be attempted to be effected, are as follow, viewing it as a species of tic douloureux :—

The Quinine given in large doses. The greatest extent to which I have known it carried was 24 grains in a day, in doses of eight grains at a time.

Large doses of Peruvian Bark have been known to be of great use, as Dr. Kerrison has proved in the case of Lord C——, whom I attended with him.

Steel, in the form of the Sesquioxide of Iron, in large doses, has been found a remedy in many cases, which was first ascertained by Mr. Hutchinson, of Southall.

The Liquor Arsenicalis, when the disease occurs at regular periods, and wears an intermittent type, I have several times seen very efficacious.

Ammonia, in large doses, combined with Camphor, is sometimes an effectual remedy.

Wine, brandy, and other spirituous drinks may relieve the severity of an attack, although frequently, they subsequently tend to its renewal, and even its increase.

The various narcotic remedies should be employed with a view of lessening the irritability of the nervous system.

The following prescriptions are excellent remedies as narcotics.
℞ Conii, gr. iij. Opii, gr. j. Extr. Stramonii, e Seminibus, gr. ss. M. bis terve quotidie sumend.

Belladonna, from gr. ss. to gr. iij.—Hyoscyamus also may be given in large doses.

Opium, either in the form of the Black Drop; the Liquor Opii Sedativus, or the Extract, or Tincture of Opium, are highly beneficial.

Calomel, Opium, and Antimony should be given in combination, if the secretions of the liver, and skin be defective.

The local application of the Extract of Belladonna has been found occasionally beneficial.

Opium and Camphor rubbed upon the part often give relief. Ice sometimes produces a cure.

The symptoms may also be mitigated by irritating the skin, in the vicinity of the disease by the application of a Blister to the groin, and thigh, and maintaining a discharge, by the Ceratum Sabinæ cum Opio.

The application of Tincture of Iodine, until it produce considerable irritation on the skin, has been tried with a good effect.

The Pyroligneous Acid may be applied upon the scrotum; but it requires care, as it is very irritating.

In those cases in which the complaint arises from organic disease in the brain, mitigation of symptoms, only can be expectd; but altered action in a particular nerve, or in the nervous system, generally admits of cure.

A sea voyage to a warm climate I have known give great relief, probably from the rest which the ship enforces, and from the improvement which sea air, and change of climate, sometimes produce in the general health.

It is generally my plan in this disease to begin by giving Calomel and Opium, even to a degree slightly to affect the salivary glands, and to excite all the secretions; and to these the Decoctum Sarsaparillæ Compositum is to be added, as it has some power in diminishing the irritability of the system. I also apply a Blister to the groin, and procure a discharge from it by the Ung: Hydr: et Ceratum Sabinæ combined, in equal quantities; and to the testicle itself an evaporating lotion of diluted Spirits of Wine and Æther, or of the Nitrate of Potash with Muriate of Ammonia.

A slight discharge, produced by the Unguentum Lyttæ from the beginning of the urethra, is sometimes of use.

But there are cases, in which all the means to which science, or experiment can have recourse, will not succeed; and then the patient absolutely insists upon the removal of the part; of which the three following cases are examples.

CASE I.

Mr. G—— contracted a gonorrhœa at Paris in October, 1815, and in consequence, had inflammation of the right testicle, for which he applied fomentations, and took aperient medicines. The testicle continued swollen, and painful, until June 1816, when the application of plasters removed all inconvenience. A slight degree of pain returned at intervals until June 1817, when he was again relieved by plasters, and thought himself sufficiently well to join his Regiment. The exercise which his duty obliged him to take, soon occasioned so much pain, that during the Winter of 1817, and Spring of 1818, he scarcely had a moment's respite; but he then only used a blister, which he thought increased the tenderness. In May, 1818, he returned to England, and bathed in the sea till September, at which time the pain was nearly removed; but he was unable to walk or ride. Since, he has not employed any remedy, beyond nine weeks' sea-bathing at Brighton, which produced no amelioration: he was unable to walk ten yards without experiencing considerable pain. But what was extraordinary, the only thing which appeared to relieve him was violent motion in a rough carriage.

On account of the continued pain, confinement, consequent depression of spirits, and loss of health, he determined on having the testicle extirpated, and I removed it on the 1st of March, 1819.

The wound healed slowly, and one or two small abscesses formed in the scrotum; but he ultimately did extremely well, and without having any return of pain in the spermatic cord.

CASE II.

Captain P—— had an irritable state of the left testis, which commenced in March, 1818. The veins of the spermatic cord were distended; the part was exquisitely tender to the touch; and exercise produced a degree of suffering, which was intolerable, if the part were not supported. He could not rest on the side, or bear the slightest pressure on the testis. He had increased pain in coition; and after it, the part felt full, and loaded. He was somewhat, but only for a time, relieved by the hot bath, or fomentations. He tried blistering at five different times; applied leeches on separate occasions to the amount of two hundred to the affected part; and employed various lotions, Opium, and Belladonna, with every medicine which seemed likely to be useful, in lessening the irritability, but all without effect.

I removed the testicle for him in 1823. He quickly recovered from the operation, and felt very grateful for his restoration to comfort, and society.

CASE III.

This Case is drawn up by the gentleman himself, who came from America to consult me. He also saw Mr. Abernethy, and Mr. Pearson.

Having tried every variety of medicine and local treatment without advantage, and determining not to return to America with the disease, at his request I removed the part, and have since heard that he remains quite well. He gave me the following report of his case.

" For several years past my left testicle has been larger than my right; at times considerably so, especially when I have taken cold. Early last summer I began to be uneasy about it, but neglected to take advice. In August I lost two children by the yellow fever; and in my anxiety, I exposed myself to unusual fatigue: and in a few days after their death, the last week in August, I had for the first time, pain in the left thigh and groin, and also in the testicle, which was much enlarged. I then applied to one of our best Surgeons, who made an incision into it, and let out a large quantity of water; this was about the 10th of September: he then desired me to suspend it, as I now do, and to use a lotion of Extract of Lead, and Opium. In a few days after, the part again became painful, for which I applied tepid poultices of bread and milk, and bathed it in warm water. The pain continued, and in about six weeks after the operation was repeated, but very little water was drawn off. No injection was used. For some time previous, and for about six weeks after the second incision, I took Mercurial Pill, two or three each day, and occasionally used Mercurial friction on the thigh and testicle, keeping up a soreness in the mouth, but not producing much salivation. With some intermissions, this course was continued for about four months. I laid in an horizontal position, excepting occasionally for a few minutes at a time, and drank only toast and water: lately I have taken Madeira, and water, or one or two glasses of Madeira at my dinner.

" In December a blister was applied to the scrotum, and produced a copious discharge. I think all these remedies gradually reduced the testicle, but the pain continued: sometimes a sharp shooting pain in the groin, but generally a heavy, dull, constant uneasiness.

" In March I procured some leeches from New York, and applied seven, bathing with tepid water; by which I got away a considereble quantity of blood, producing great debility. In April, I again applied three leeches; since which I have used the lotion of Lead, and Opium.

" At present, the part is about the same size as it has been for two months past; but the pain is constant, and I cannot stand for ten minutes without increasing it considerably. There is great sensibility in the part, which the slightest touch aggravates.

" My general health is as good as it has been for years past. I am always subject to head-ache, and other dyspeptic symptoms, probably the effect of a long residence in warm climates which has injured my constitution."

CHAPTER V.

INFLAMMATION OF THE TESTIS, FROM CYNANCHE PAROTIDEA, OR MUMPS.

CYNANCHE Parotidea is produced and accompanied by a species of fever, the effect of which, is a swelling of the parotid, and sometimes of the submaxillary, and sublingual glands; and occasionally with an enlargement of the mamma in one sex, and increase of the testicle, in the other.

This disease principally affects young people, and the glandular enlargements which it produces are seated sometimes on one side, sometimes on the other, and now and then on both sides of the body.

The glands are hard, and painful, and by their pressure more or less affect deglutition, and if very large, sometimes impede respiration.

The disease reaches its height in a few days, then begins to decline, and in a few days more, it generally disappears.

Suppuration is rarely a consequence of this disease, either in the salivary glands, the mammæ, or the testes.

The first case which I had an opportunity of witnessing of this complaint, was in a gentleman in the Temple, who had been for four or five days the subject of slight fever, accompanied with an enlargement of the parotid, and submaxillary glands on the right side. He said—" I should not have troubled you to come to me on account of this cold, but that my right testicle last night began to increase, and is now swollen and painful." Both the epididymis and testis were enlarged and tender; but by the treatment hereafter described, he soon recovered.

A gentleman applied to me on account of a swelling of each epididymis and testicle, the form of which were pyramidal, but owing to the epididymis being more affected than the testicle itself, their length was increased, beyond the natural proportion.

The scrotum was red, and the enlargement of the left side exceeded that on the right.

His testes had formerly been swollen from a local cause; but the present attack was preceded by fever, attended with a great swelling about the lower jaw, on each side.

The testicles were swollen at the period of my visit, although the fever which preceded, and produced the testitis had commenced a month previous.

The fever in children is of the most infectious nature; and I remember attending at the school of a Miss F—— at Clapton, and when I inquired of her, respecting her health, she said she had suffered great fatigue, on account of having had the Mumps in her school.

I inquired the number of children in her establishment, and she replied from thirty to forty; and that rather more than thirty had been affected with that disease. But as this happened some years ago, that I might be sure of the fact, before I wrote what I am now publishing, I sent a letter to my intelligent friend, Mr. Toulman, of Hackney, inquiring into the circumstances, and the following is his reply :—

"Mare Street, Hackney,
July 14, 1829.

"My dear Sir,

"I perfectly remember your attendance at Miss F—'s school, at the time you have mentioned. There were at the time (but not all exactly at the same period) thirty or forty boys affected with Mumps, and all of these within three weeks. In no instance among them was there any metastasis of the disease from the glands of the jaw to the testes; but I have occasionally seen this even in adults, and also from the glands of the face to the breasts in females.

"I am, dear Sir,
"Your's very truly,
"Jos. Toulman."

When the testicle does inflame in Cynanche Parotidea, it generally happens about the age of puberty, and I believe, seldom under that period; but that it does occur after that age, although but rarely, even to between forty and fifty years of age, I am well aware.

I wish it to be understood, therefore, that I do not limit the disease, to any period of life.

The swelling of the salivary glands, and the enlargement of the testes, are generally proportioned to the severity of the Cynanche.

The Cynanche Parotidea occurs most frequently under the age of puberty.

In large schools, where observations can be best made, it is proved, that children of each sex are equally affected with this disease.

The attack of inflammation of the testes from Mumps is more frequent than the affection of the mammæ in females; and, as I have already stated, occurs most frequently at the time of puberty.

The local disease seems to be a specific inflammation, little disposed to adhesion, or suppuration; but the curious circumstance in it is, that the testes should be liable to this affection. The breast, like the salivary glands, is conglomerate; but the testicle is an entirely different structure. But time would be wasted in conjectures on the cause, of organs so dissimilar in structure, being occasionally the seat of the same disease.

The testis has been said frequently to waste after this complaint, but I have never known an instance of it in my practice; although inflammation of the testicle, at the age of puberty, arising from remote causes, sometimes produces that effect.

The treatment of this disease is very simple: it consists in giving the Liq: Ammon: Acet: with the Sulphate of Magnesia, or the Saline Mixture with Tartarized Antimony, and a Pill of the Chloridum Hydrargyri, with Pulvis Antimonialis.

The application of leeches is also proper, and a simple poultice should be applied to the neck. The best lotion to the testis is the Liq: Ammon: Acet: and Sp: Vini: rect:

But I have a dread of the application of evaporating lotions to the neck; for I once saw in a boy, about eleven years of age, the sudden reduction of the swollen salivary glands, from the use of a lotion of Liq: Plumb: S: Acet: and Sp: Vini: rect: followed by symptoms of pressure on the brain, to which delirium succeeded, and in less than a week, the boy died.

CHAPTER VI.

ON THE HYDATID OR ENCYSTED DISEASE OF THE TESTICLE.

THIS disease is comparatively rare. It is a complaint of a specific or peculiar kind; and it appears to me to be entirely local, as I have seen it in persons who enjoyed excellent health, who have retained that health after the removal of the testicle, and in whom, the disease has never shown itself at any future period.

This change in the structure of the testicle most frequently occurs about the adult period of life, or between the ages of eighteen and thirty-five years; although I have known it happen at the age of forty-nine. It has been said usually to begin in an enlargement of the end of the epididymis, and it may be so; but as it is generally discovered by accident, and after the swelling has acquired considerable size, a knowledge of the seat of its commencement is rarely obtained: but certainly, I have several times seen the end of the epididymis containing cysts, which were filled with a serous fluid.

The formation of cysts in the testicle is a disease unattended with pain in its early stage, and during the greater part of its progress, excepting when it has become very large, so as to extend the tunica albuginea, which, from its unyielding nature, occasions great pressure upon its contents.

The part, under a very attentive manipular examination, does not produce any feeling of tenderness, unless the pressure which is made, be very considerable.

The appearance of the person often indicates even robust health; and therefore the first impression on the Surgeon's mind is, that this disease may be hydrocele, as it is unattended with pain or constitutional derangement.

The veins of the spermatic cord are larger than usual, and those of the scrotum are more visible, and distended; for a very considerable quantity of blood is determined to the testis in this disease.

The natural form of the testicle is preserved; it is rounded before, somewhat flattened upon its sides, and not so pyriform as an hydrocele.

The epididymis can usually be distinguished from the testicle, in consequence of the natural line of their separation being preserved; however, this does not always happen.

The swelling gives the impression, upon handling, that it contains a fluid, for it easily yields to pressure; yet it is not true fluctuation; for it does not rise at a distance, as it sinks from the compression of the finger; but it yields only at the spot which is compressed.

If the diseased part be strongly compressed, it produces the sensation of squeezing the testicle, causing a sensation of sickness, and a pain in the groin and loins on the affected side.

The weight of the testicle, both to the patient, and Surgeon, feels obviously greater than natural; and when it has acquired a great size it produces continued pain in the loins, and inconvenience from its bulk, so as to render the patient anxious for its removal.

The inordinate size of the testicle soon becomes so considerable, as to be incapable of being concealed by the dress; which causes an additional reason for its extirpation.

The complaint is so completely local, that were it not for the above reasons, of its weight being irksome, and its size indecent and inconvenient, it would scarcely require removal; for the spermatic cord does not become affected with the complaint, nor are the absorbent glands, in the loins, or groin irritated by it: in short, it is a disease of the testis, and epididymis only.

It is true, that in the fungoid disease of the testicle, cysts are found, but quite of a different character, from those which constitute the encysted or hydatid disease of the testes. In the fungous growth the cyst is little else than a membranous capsule to the adventitious malignant developement, while in the hydated disease each cyst seems to possess an independent organization, is highly vascular, and contains a quantity of serum. To the individuality of these cysts, and their isolated condition, perhaps may be attributed the truly local nature of the complaint.

ON THE DISSECTION OF THE ENCYSTED DISEASE OF THE TESTICLE.

Upon dissecting the hydatid or encysted disease, the tunica vaginalis is found thickened, and partially adherent; and the tunica albuginea, both of the epididymis and testicle, is very much denser than natural.

The testis itself appears to be composed, in part of a solid structure, and in part of cysts, varying in size from the head of a large pin, to the magnitude of a small marble: as they vary in size, so they differ both in their appearance, and their contents. The smaller ones contain a transparent and yellow serous fluid, while the larger ones having undergone a change from inflammation, their sacs are become thickened, and their contents, of a mucous nature, bearing some resemblance to bursæ.

Those cysts which contain serum, are highly vascular; and when the testis is opened, immediately after its removal, their appearance is very beautiful, the vessels being distinctly visible ramifying over the yellow ground of serum. [See Plate III. fig. 1.] While those which have been inflamed, cease to be transparent, and do not exhibit the same degree of vascularity. The appearance of the testicle would seem to indicate that these cysts are enlargements, and obstructions of the seminiferous tubes, having become increased by the accumulation of fluid within them, and connected with each other at their different convolutions; but their formation must be in a great degree conjectural, as to whether they be produced in the cellular tissue, by effusion into its cells, or in the seminiferous tubes. It is quite certain, however, that they are not of the nature of animal hydatid; I am inclined to the opinion, that they are formed of enlarged and obstructed seminiferous tubes; for when I minutely dissect them, although at first sight they appear to be cysts, yet when traced, they are not distinct bags, but send out solid processes, by which they are connected with other cavities, as the Plate will show. The affection ought, therefore, to be called the Tubular Disease of the Testis. I have seen absorbent glands undergo very similar changes, from enlargement and obstruction of their cells and vessels, and having a fluid secreted into them.

The appearances of the epididymis, are similar to those of the testicle ; but I have never seen the cysts in it, acquire the same magnitude.

ON THE DIAGNOSIS, OF THE ENCYSTED, OR HYDATID DISEASE.

This disease is often mistaken for hydrocele; and I do not believe, that the most extended experience, or the nicest and most minute manipulation, can entirely prevent the liability to occasional mistake in the diagnosis ; for it must be confessed, that the complaints bear, in their general symptoms, a close resemblance to each other. Nor do I believe that there is any Surgeon of candour, although he may have been attached to the large Hospitals of this overgrown City, and had the first opportunities for experience, who will not confess that he has been mistaken in his judgment between the two affections.

I know that there are persons who never confess an error, but give all their successful cases to the world, carefully concealing those that are unfortunate, and thus lead young men to believe that our profession is much more successful than it really is: but this is a most unjust mode of proceeding; for it is only by a comparison of success, and misfortune, that a fair and honest conclusion can be drawn. A Surgeon once said to me, " You are foolish in mentioning your unsuccessful cases, which the world will discover soon enough :"—To which I might have replied, "You are dishonest, in relating those only which are successful, as you thus give an improper colouring to your profession."

For myself, I have to confess that I have two or three times been mistaken, and put a lancet into the part, expecting to find water issue; and a few drops of blood only have followed. But further I will observe, that I have no shame in confessing this, nor have I seen mischief arising from it; but, on the contrary, in doubtful cases, I recommend that a small incision be made into the tunica vaginalis, and the point of the lancet be passed into that tunic, to ascertain if it contain a fluid or not. In doing this, no injury can happen to the testis; and the Surgeon's mind is completely at rest, respecting the existence of hydrocele.

I may, however, observe, that the following are the marks of distinction, between the two diseases.

First—In the encysted testicle there is rather a yielding, than the fluctuation to be felt, which is always concomitant with hydrocele.

Secondly—In this disease, the swelling is always heavier than the tumour of the same size from hydrocele.

Thirdly—The general form of the testis is more preserved, although it is somewhat more pyriform than the testis naturally is.

Fourthly—The entire absence of transparency.

Fifthly—The sensation of the testis being squeezed, with less compression than when the disease is hydrocele.

Sixthly—The more dilated state of the vessels of the cord, and scrotum.

And Seventhly—The testis in hydrocele, can be felt at the lower and back part of the swelling, although obscurely, which is not the case when the disease is of the encysted nature.

CAUSE.

Respecting the cause of this disease, it is entirely unknown; but by the patients themselves I have observed, it is usually imputed to a blow, or to a cold. It appears to be in its nature, as I have already said, an obstruction of, and altered secretion into the seminiferous tubes; but as to its cause, I shall not indulge in any speculative opinion upon a subject, which would be unsatisfactory, for want of proof, and could scarcely lead to the prevention of a disease, which has so generally acquired considerable extent, before it is discovered; nor could such conjectures tend to restore the part to health, or lead to a cure, even if a theory of the formation of the disease were well established.

TREATMENT.

I have never seen any medical, or local treatment in this disease of the smallest efficacy; indeed, he who has examined the appearances which it produces, and the change of structure which it occasions, could not expect any benefit to result either from constitutional, or local remedies.

The removal of the part is the only means offered of relief; and in consequence of the inconvenience resulting from the weight of the diseased part, from the pain which follows the dragging down of the spermatic cord, the indecency of so large a swelling, which cannot be concealed, and from the continual increase of the malady, the patient himself becomes anxious for the extirpation of the disease. A system of depletion, and abstinence for a week, will bring the patient in a fit state to bear the operation well; and it is one, which for this disease I never knew unsuccessful, as the powers of the constitution suffer but little diminution.

The strongest assurances may be given to the patient, if the case be purely of the encysted character, that it will never produce any influence upon the surrounding, or adjacent parts, and that the operation will be completely successful, in eradicating the disease. However, it is right to observe, that the fungoid, and encysted disease, may be combined in the same testis, and then the case may prove fatal; but this will be ascertained by the dissection of the removed part, which will lead to a favourable opinion in the encysted disease, and to a decidedly unfavourable one in the other; hence therefore the positive prognosis should be withheld, until after the diseased organ has been examined.

CASES.

In the following cases which have fallen under my observation, it will be found there are very few symptoms, and but little variety in the character of the disease; but as to the accuracy of my notes I can pledge myself as they were made while the cases were under treatment.

CASE I.

Charles Demby, aged forty-nine, was admitted into Guy's Hospital the 23d of May, 1804, with enlargement of the testis. He described that about two years before, the disease began by a diminution of the left testicle, accompanied by a sense of weakness on the left side. It afterwards gradually became larger than the other, and he applied, three-quarters of a year after discovering the increase, to a Surgeon of the first talent and respectability, in the neighbourhood of London, who introduced a trocar into the testicle, and finding but a few drops of serum issue from the puncture, he immediately pronounced it a case of hydatid testicle. As the swelling still continued to increase, the patient applied to be admitted into Guy's Hospital. On the 29th of May I removed the testis; and upon cutting into it, I found a muco-purulent fluid in some of the cysts, the appearances of which I have exhibited in [Plate III. fig. 2] representing their various sizes, as well as the difference of their contents; some being transparent, others opaque, some distended with serum, others filled with mucous, and some with a clear water, containing but little animal matter.

The wound soon healed; and he was discharged on the 16th of June, having thus quickly entirely recovered.

CASE II.

A young man, twenty years of age, by mere accident discovered a small tumour at one extremity of the testicle, for which he could in no manner account, nor could he remember, when giving me a description of his case, at which part of the gland the swelling commenced. At first the tumour was attended with but little pain, and was usually soft to the feel, but as it gradually grew larger, it would sometimes become extremely hard and painful, as if suddenly distended, and almost as suddenly resume its flaccid and easy condition, these changes occurring without any obvious cause. Having suffered this inconvenience for a twelvemonth, he had the testicle extirpated. Three days after the operation, exuberant granulations began to sprout from the truncated extremity of the spermatic cord, which had been probably too loosely tied, for a second ligature was required to remove the granular surface, which it perfectly effected, by being drawn sufficiently tightly to cut off all supply of blood.

On cutting into the testicle, it was found to be composed of numerous cysts, of different sizes and forms, containing a serous fluid in some parts; in others it was like the white of egg. In one part, the testis was very compact, and there indicated a tendency to suppuration.

CASE III.

Bartholomew Lupre, aged thirty, an Italian sailor, was admitted into Guy's Hospital in April, 1809, with an enlarged testis, which he reported had begun four or five months before his admission. Its cause was unknown; but he supposed it arose from a cold, produced by wearing wet clothes.

The veins of the scrotum were much loaded with blood, and those of the spermatic cord were varicose.

This man suffered considerable pain in his loins, from the weight of the swelling. I performed the operation of removing the testicle, and found it, upon dissection, full of cysts of various magnitude.

CASE IV.

A young medical man called upon me with an enlargement of the testis, which was about seven times its natural size; it was entirely unattended with pain; its increase had been very gradual; but its abnormal weight was very evident both to himself and to me; its fluctuation was very obscure, and it was not transparent. His general health was good; and as he came to consult me on the propriety of an operation, I, after some trial of remedies, recommended him to lose it; and Mr. Guthrie removed the testis, which I examined, and found it to be of the hydatid or encysted kind. He gradually recovered; and it is almost unnecessary to add that he did very well.

OF THE ANIMAL HYDATID IN THE TESTIS.

I have never seen this disease in the living subject, and therefore I know nothing of the symptoms which it produces. But Mr. Davie, who was formerly a dissector for our lectures at St. Thomas's Hospital, after one of the lectures, brought me a testis, the epididymis of which, contained a cyst, formed by adhesion; and within that cyst was an hydatid, having a pearly appearance, perfectly detached from the bag in which it was contained, and filled with a fluid of a watery appearance. The testis was somewhat larger than usual; but I do not think it was twice its natural size. It would seem that the embryo of these animals may be deposited in any enclosed part of the body, and will there grow.

CHAPTER VII.

ON SCROFULOUS INFLAMMATION OF THE TESTIS.

CHRONIC diseases are founded on two states of the constitution: they may arise, either from an original delicate and weakly diathesis, or they may be the result of changes in a healthy constitution, produced by excessive fatigue of body, anxiety of mind, by intemperate habits, or vicissitudes of temperature.

The first of these states is called scrofulous, to distinguish it from the chronic inflammation of after-life; and which may be, either simply chronic, or of a malignant character.

Having already described the simple chronic inflammation of the testis, I shall now proceed to point out the peculiar circumstances attending the scrofulous disease of this organ.

The shortest and the most concentrated idea, I can give of scrofula, is, that it is congenital, or original debility; and this state of the body is marked, by peculiar characters, both in external formation, and in internal structure.

A prominent external characteristic of a scrofulous constitution, is the state of the skin, which is peculiarly thin and delicate in its structure.

It is usually of a light colour; but this is far from being uniformly the case, for it is sometimes dark; but in either case, if it be gently pinched up, it will be found extremely thin, when compared with that of a strong, and healthy child; and as this state of delicate fibre in the skin, denotes a similar internal structure, it becomes an easy criterion of the general conformation of the body.

This thinness, and delicacy of the integuments, leads to that fixed and florid colour, which the face of such individuals usually exhibit, and which is considered as a great beauty by the cursory observer, but ought to be regarded, as a sign of constitutional weakness, by the intelligent mind. It arises from the blood in the arteries being seen through their delicately constructed coats, and their thin cutaneous covering.

From the same delicacy of the skin, the veins are seen permeating the cellular tissue; and the darkness under the eye, which is so common an attendant of this conformation, under slight indisposition, arises from congestion in the veins, and difficulty in the free return of their blood.

From weakly vascular action, also springs the thickness of the lip, as the blood is retained in this very vascular structure;

and from the same thinness of the skin, the vascularity of the glands of the tarsus, appears through the edges, and surface of the eye-lids.

Flaxen or delicately silken hair often attends this state of the skin; and in those, whose hair is red, there is a strong natural propensity to scrofulous diathesis.

Black hair and a dark skin are, therefore, generally signs of a healthy formation; but if the skin be thin, its colour is not a guarantee from a scrofulous tendency.

Children healthily formed, indeed the very strongest, may have, from deficiency of air, of exercise, or of food, most serious diseases produced in them; but then their complaints resemble chronic disease in the adult, rather than the peculiar inflammation arising, from original debility.

The thinness and delicacy of the skin exist in each of its constituent parts: the cuticle, from a blast of cold air, chaps and desquamates; and the sun's heat, parches, and cracks it.

If the person be exposed to cold, and subsequent heat, the cutis easily inflames, and the cutaneous absorbent vessels become irritated, and the absorbent glands inflamed.

This effect is most frequently seen in the skin of the face and ears; for when these parts have been exposed, irritated, and chilled by a cold wind, the child comes before the fire, and the sudden heat inflames them:—of this inflammation the cutaneous absorbents partake, and it is extended to their glands; and from hence spring the frequent glandular enlargements in the neck.

Such is the formation of the covering of the body; and when tracing its interior conformation, the child will be found to have a similar structure throughout.

The stomach and intestines are thin, even to a degree to be nearly pellucid; and hence the process of digestion, and chylification are imperfectly performed.

The parietes of the heart are less muscular than usual, and the circulation is necessarily enfeebled.

The coats of the arteries are so thin, that near the surface, as I have mentioned, their blood may be more clearly seen through them, than in a healthy child; and so feeble are they in their power of contraction, that in the last acts of life they do not empty themselves, as under the common circumstances of healthy construction; and as these vessels aid the circulation by their elasticity at least, if not by their muscular structure, they are less able to do so, than in a child differently constituted.

The veins probably partake of the same feebleness, as well as the absorbent vessels; and hence the tendency to the irritability of these latter vessels and their glands, rendering them peculiarly prone to morbid actions.

The secreting glands are but little liable to scrofulous actions, for the salivary glands, the liver, the kidneys, and the pancreas, are rarely diseased in scrofulous children; but to this rule there is an exception in the mucous glands; for those of the small and large intestines, are often diseased and ulcerated, and the absorbent vessels and their glands becoming irritated, the mesenteric disease is in this way produced, indicated by a great enlargement of the abdomen, irregular appetite and evacuations, wasting, and death; when, upon dissection, the mucous glands are found inflamed and ulcerated, and the whole cluster of mesenteric glands much enlarged.

The nervous system differs greatly in different persons afflicted with this state of constitution. In some persons there is remarkable indolence, so that often, an enlargement of a joint begins without pain, and continues for weeks and months in a state of indolent swelling: and even if it suppurate, there are some persons whose constitutions scarcely sympathise, and whose joints, although enormously large, produce very little local suffering, and will permit considerable exercise to be taken, until the disease terminates in the production of a more or less perfect anchylosis.

The mind also, equally indolent with the body, suffers but little alarm.

But this obtuseness of mind is not an invariable symptom of scrofula, for some cases are attended with a most remarkable degree of irritability, and in the very dawn of the disease severe pain is felt; the least excitement of body producing great irritation of the constitution, and the most hurried action.

Frequently more than one joint is simultaneously affected, and then metastasis from one joint to another often occurs.

The mind is as irritable as the body; the slightest circumstance alarms; the least irritation is severely felt; and these cases are often accompanied with a remarkable precocity of talent, which is regarded with admiration by the parent, but which ought to excite apprehension rather than pleasure, and to lead to additional care and provision against all the exciting causes of disease. For such a mind, marks a feverish rather than a healthy or powerful intellect; and, instead of being forced into exertion, to which parents are naturally prone, its efforts ought to be checked rather than encouraged; but instead of this, as they learn and retain easily, the parent or governess is delighted to use every effort to instruct them.

Such is the difference of constitution in different persons, as regards the state of the nervous system; but there is a general agreement in them as to the delicacy and weakness of natural conformation.

I have stated that the secreting glands are rarely affected in this disease with any remarkable changes of structure; but to this rule there are occasional exceptions, and the testicles sometimes become affected.

One of the testicles, even in very young children, sometimes becomes enlarged, and very hard, but without pain or any inconvenience; and the disease is accidentally discovered by the parent or servant. In this state of indolent increase it remains for many weeks, months, or years, and then, under improvement of the general health, the enlargement subsides, and the gland resumes its natural state.

More frequently it enlarges at the age of puberty, and from that period to twenty years: and not unfrequently this disease appears in both testes, marked by the same hardness, and such absence of suffering, that the person does not for a length of time seek any medical aid respecting it. The part is free from tenderness as well as pain. The scrotum is unaffected; its veins are not enlarged; and, but from its bulk, the patient suffers no inconvenience.

But even in children, although more frequently at puberty, the inflammation sometimes proceeds to suppuration; this generally occurs within the globus major of the epididymis; but I have known abscess form in the cauda, or small extremity of that organ.

The body of the testis but rarely suppurates, until after the epididymis has ulcerated, when the testis becomes affected, and the scrotum puts on a livid hue; ulceration next ensues, indicating the presence of an abscess, which discharges ill-formed pus and some semen, if after the age of puberty; the opening under these circumstances is extremely difficult to heal, continuing for months, and even for years, before it closes.

In some persons, one abscess after another forms and discharges; and when one testis has suppurated, if the other has been hard, it is also liable to put on the same action, discharges itself, and continues equally obstinately resisting all the means of treatment, for a great length of time.

Ultimately the testes diminish, secrete but a small quantity of semen, and they continue to waste until but little of them remain, and their function almost entirely ceases.

Mr. S—— had a scrofulous abscess in each epididymis, and both testes wasted. Only two or three drops of thin fluid issued under an unnaturally excited emission. He had erections, and occasionally a desire for sexual intercourse, but had no nocturnal emissions. He has had the disease for four years, and a sinus from each epididymis still discharges a quantity of fluid, which stiffens the linen.

After venereal excitement, these sinuses issue an increased quantity of fluid; and one patient under similar circumstances informed me that the discharge sometimes became of a brownish colour, as if slightly tinged with blood.

DISSECTION.

Upon examining the epididymis and testis, when affected with this disease, I have found a yellow spot in the former, surrounded with a zone of inflammation.

When the spot ulcerates in its centre, the matter which it contains is not pure pus, but it is composed of fibrine and serum, with a slight yellow tinge. I have seen such spots in the globus minor, but more frequently seated in the globus major of the epididymis.

In the testes there are generally several similar yellow spots, accompanied by the same inflammatory zone; and yellow streaks are also found amidst the tubuli.

Scrofulous abscesses in the testes are sometimes accompanied by a granular swelling, like that which exists in the simple chronic disease.

DIAGNOSIS.

This species of inflammation is known by the period at which it occurs, that is, about the time of puberty, or under that age; for it rarely appears after the person is adult.

It is to be also distinguished, by the character of the patient's constitution, being such as I have described: and, lastly, it may be known, by diseases of a similar kind being found in other structures, as in the absorbent glands, in the joints, or in the lungs.

TREATMENT.

As this disease is founded on debility, and the feebleness is congenital, it becomes necessary to recruit the constitution if there be any adventitious weakness, and to gradually strengthen it, as much as possible.

We possess no specific remedy for this purpose, but we can benefit the patient by placing him in the best air, and that of the coast is generally the most advantageous; for the purer the air, the stronger is the circulation of the blood, and the greater is the tone of the nervous system.

The vigour of the circulation is also increased by exercise, but in this disease, riding on horseback, which is otherwise the best exercise, may increase the local disorder.

The diet should be nutritious, animal food, with a due proportion of vegetable, should be allowed at least once a day. Ale or porter, or wine and water, should be the beverage at dinner, unless flushing or feverish heat be produced by them. Milk, chocolate, cocoa, arrow-root, sago, as they nourish without exciting any irritable action, are therefore very beneficial.

Tepid sea-bathing also should be used.

Hydr. cum Creta, with Rhubarb, ought to be given alternate nights, or Pulvis Columbæ, Rhubarb, and Soda, twice a-day.

The Vinum Ferri, the Tinct: Ferr: Sesquichloridi, Tinct: Ferr: Ammonio-chloridi, or the Sesquioxidum Ferri, with Pulv: Rhei, in pills, are very useful remedies.

The Quinine, with the Infus: Rosæ and Acid: Sulphur: Dilut: should be given.

The Liquor Potassæ is sometimes found beneficial; but if long continued, it is apt to weaken the stomach.

The Bichloridum Hydrargyri, in minute doses, with the Compound Decoction of Sarsaparilla, or in combination with the Tincture of Bark, or Rhubarb, is an admirable medicine.

Concentrated Compound Decoction of Sarsaparilla is often given with advantage.

Tincture of Iodine I have seen produce such serious effects on the stomach and bowels, that I fear advising it, unless with great precaution.

Thus it will be seen that a great variety of medicine is obliged to be had recourse to, as one or other best agrees with the individual; but the general principle in their use, is to restore the secretions, if unhealthy or suppressed upon the one hand, and to give tone to the digestive functions, to the circulation, and nervous system, on the other.

As to the local treatment of this disorder, in its adhesive stage, the Ointment of Iodine may be rubbed upon the part, or the Linimentum Hydrargyri, or the Emp: Hydrargyri, may also be applied; the principle being to produce absorption of the diseased effusion: but it may be observed, as this effusion is rarely organized, the absorbents can only act upon its surrounding tissues, and therefore absorption must necessarily be very slow, when compared with that, in common adhesive inflammation, and effusion. Lotions may be used with the same views, as the Liquor Ammon: Acet: cum Sp: Vini, or the Liq: Plumb: S: Acet: Dil: cum Sp: Vini; for, if there be much pain attending this stage of the disease, they tend to subdue the inflammatory action.

If the disease goes on to suppurate and ulcerate, the sinus is always very difficult to heal: and therefore the following injections should be employed, either, a solution of the Sulphate of Copper in the proportion of a grain to an ounce of distilled water, or the blackwash. I have also seen Port Wine employed as an injection, as well as the Corrosive Sublimate, and Nitrate of Silver in solution, with considerable advantage.

CHAPTER VIII.

OF THE VENEREAL INFLAMMATION OF THE TESTIS.

WHEN the venereal poison has affected the constitution by being taken into the system by absorption, some parts of the body seem more prone to be influenced by its action than others, and the throat, skin, periosteum, and subsequently the bone, are generally attacked in the consecutive order here described; but neither the eye or the testicle are free from the liability of venereal poison, as is frequently evinced by the presence of iritis and testitis concomitantly with sore throat, and secondary venereal eruptions. Some structures seem incapable of being affected by this poison, as the abdominal, thoracic viscera, and the brain, for they remain free from specific derangement even in fatal cases of secondary syphilis.

There are some persons, however, who believe that the testicle is insusceptible of the venereal influence, and who smile at the idea of Mercury being necessary for its cure; yet I have seen this organ so frequently enlarged during the existence of secondary symptoms of syphilis, more especially in combination with a cutaneous and periosteal venereal affection, and have also observed it more swollen and painful in the evening, relieved, however, by the recumbent posture in bed, known it yield so easily and readily to the influence of Mercury, and just in proportion to the disappearance of the venereal symptoms, that I think it quite unreasonable to doubt its liability to be affected by this specific poison.

The swelling of the testicle which occurs in gonorrhœa has nothing specific in its nature, nor is the constitutional influence of Mercury necessary to its cure; for the gonorrhœal and the syphilitic poisons differ in their nature, and in the effects which they produce; the swelling of the testicle in gonorrhœa being sympathetic only.

When the venereal poison affects the testicle, it probably in the first place attacks the tunica albuginea, and thence extends into its interior fibrous, and not into its tubular part; but this I allow to be hypothetical, and am led to the opinion merely from the structure of that part most resembling the periosteum in its tendinous composition, and also from the very ready and complete recovery of the function of the organ; but I wish the reader to understand that I have had no opportunity of dissecting this disease.

The testicle and epididymis under venereal inflammation become four or five times their natural size. The pain which accompanies the disease is not severe, but it is increased towards the evening. One testicle being enlarged, the other is apt to become affected; but I think, in the majority of cases, that the disease commences in both testicles simultaneously.

The complaint very rarely proceeds to suppuration; but when it does so, it produces a granular swelling, as in the chronic abscess.

The enlargement of the testicle is rarely a concomitant of the syphilitic sore throat only, but is generally accompanied with venereal eruption, and periosteal inflammation.

The distinguishing marks then of this disease from the simple chronic enlargement of the testicle, will be found to be the following; its succeeding a primary syphilitic sore, and its being combined with the secondary symptoms which I have already described.

CASE I.

A gentleman was the subject of a hydrocele, with an enlarged testis; and it had been proposed by a Surgeon who had attended him, to remove the latter, because, in attempting to tap the hydrocele, no water had issued, and he had therefore concluded the disease to be a solid enlargement of the testicle only. I was then requested to see him; and he mentioned to me that he had some enlargement of the tibia, accompanied with nocturnal pains. I desired him to undress; and upon examining his skin, I discovered a venereal eruption upon the fore-part of the chest and the abdomen. I ordered him to undergo a course of Mercury; and as the venereal eruption vanished the node lessened, the nocturnal pains ceased, and the enlargement of the testicle disappeared: the hydrocele was then injected, and the patient got perfectly well. He has since married, and had several children. There can be no doubt that in the attempt to remove the fluid of the hydrocele during the enlarged condition of the testicle, the trocar had penetrated that organ, and thus prevented its escape.

CASE II.

A. B., aged 32, had the epididymis on the right side greatly enlarged, and very much hardened; and this was accompanied with pains in the head and limbs, worse at night, which deprived him of sleep, and rendered him, as he expressed it, almost distracted: he had also a node upon his left tibia, and pain and enlargement of the ulna. He had been the subject of a chancre four years and a half previously, and had taken Mercury, under the influence of which the disease soon disappeared. He continued well for some time, when an enlargement in the groin made its appearance, but was of short duration. From that time he has had pains in his bones, which have continued under different degrees of aggravation, in proportion as he took medicine to relieve them, or desisted from its use. Subsequently the epididymis and testicle became enlarged, and have now continued so for twelve months accompanied with pain, which was at first severe, but has latterly much diminished in intensity.

CASE III.

A gentleman who had been frequently subject to sore throats, which I thought venereal, had his testis gradually enlarge without pain. Its shape was pyramidal; and not being able to distinguish it from hydrocele, I put a lancet into the tunica vaginalis, but only two or three drops of blood were discharged. I gave him the Bichloridum Hydrarg: dissolved in the Tincture of Bark, which quickly reduced the enlargement of the testicle, and he perfectly recovered.

CASE IV.

A man applied to me in November, 1807, with a testicle diseased, and as hard as marble. Four years before, he had been the subject of a venereal complaint, and a few weeks afterwards the testicle became enlarged; under the use of Mercury for a month the enlargement was removed. But in four months the swelling in the testicle returned, but yielded a second time to the use of Mercury for two months.

This patient remained convalescent for two years, when he had a relapse, and was obliged again to have recourse to Mercury, which was attended as usual with relief of his symptoms; the disease seemed, however, only to be suspended, for in the following Spring he was again attacked, when the Mercury was desired to be continued for a length of time, keeping up a protracted state of ptyalism, which I suppose permanently cured him, for I possess no further notes of the case.

CASE V.

A. B. had a chancre three years ago, which was not succeeded by bubo. A year since he had a hydrocele in the right tunica vaginalis, which disappeared under the use of Mercury and evaporating lotions. Seven or eight months ago he observed a swelling in the right testicle, which now continues: the testis is extremely solid, the epididymis is enlarged, the scrotum is red, and there is pain in the loins and groin.

CASE VI.

C. T. has enlargement of both testes, without redness of the scrotum, and with very little pain. I thought them venereal enlargements. He took large quantities of the Compound Decoction of Sarsaparilla with the Bichloridum Hydrargyri, and got perfectly well.

CASE VII.

A gentleman's servant had a chancre and bubo twelve months ago; since which time the left testis had become enlarged, very much hardened, and it was accompanied with hydrocele. Mercury was given him, and he recovered.

CASE VIII.

A gentleman, aged 32 years, had four years ago a chancre, for which he took Mercury until it was healed, and it remained well. A few months afterwards he had pains in his limbs and in his head, and they were succeeded by enlargement of the tibia. He used Mercury at various times, in sufficient quantity to subdue the symptoms, but not to cure the disease.

Fourteen months ago he had a swelling begin in the right testicle, which gradually increased; and then he was attacked with pain in the left, in which a hardness remained to the period of his consulting me. I ordered him for this disease Calomel and Opium in quantities sufficient to affect the mouth, and to continue it for six weeks at least. I also desired him to observe the recumbent posture, to apply leeches, and the Liq: Amm: Acet: with Sp: Vini, as a lotion. Under this plan of treatment the testicle became entirely reduced; but when he left town, after giving up the Mercury, the pain in his leg was not completely subdued: but since which period not having heard of him, I have reason to believe he was permanently cured.

I am by no means disposed to dispute with those, who may consider such cases as I have related not being of a venereal nature, and who may think the time is too remote for the poison to lurk in the system, or even that the symptoms are not sufficiently decisive to render the nature of the disease a matter of certainty; but of this I am sure, that I have seen such enlargements of the testicle, combined with syphilis, and that their best mode of treatment is similar to that of iritis, namely, of giving considerable doses of Mercury, so as to induce and support a great and continued influence of it upon the system; and then to exhibit the Compound Decoction of Sarsaparilla, for a length of time.

It can scarcely be supposed that I am not fully aware, that the cure of a disease by Mercury, is no proof of the complaint being venereal, as I have indeed shown, that simple chronic enlargement of the testis, gives way to its use. But I feel assured that the testicle becomes affected, during the progress and influence of the syphilitic poison, upon the constitution of some persons; and that Mercury, whilst it subdues the other symptoms, is also the only cure for this disease. It is, however, proper to remark, that in the treatment of syphilitic enlargement of the testis, the recumbent posture must be strictly observed, local depletion used, and evaporating lotions applied, as they assist in producing the cure, although they do not effect it without the concomitant influence of Mercury.

CHAPTER IX.

ON THE OSSIFIC INFLAMMATION OF THE TESTICLE.

THE deposition of earthy matter is by no means an unfrequent occurrence in other structures, besides that of the osseous system; for it is not at all uncommon to find it in those permanent cartilages which supply the place of bone, as in the larynx, trachea, and the cartilages of the ribs. It is also, but less frequently found, in the ligamentous tissues of the body, as in the ligaments of the symphisis pubis, in the sacro iliac symphisis, and in those of the spine; and even tendons have sometimes such dispositions at the point of their insertion into bones. The arteries are not unfrequently affected with this change of structure, and in these vessels the earthy deposits are the usual concomitants of age; and they are found between the membranous, and circular fibrous coats. The serous membrane, as is frequently seen on the pleura on the inner side of the ribs, have sometimes large patches of earth on it: the pericardium, on the surface which is turned towards the heart, also sometimes secretes bone; and the peritoneum, on the surface of the spleen, is often found loaded with it.

In dissecting enlarged and excessively hardened testes, I have sometimes met with deposits of earth variously situated within their structures.

The tunica vaginalis occasionally undergoes this change; and a portion of that membrane, thus diseased, was given me by Mr. Warner, Surgeon to Guy's Hospital, forty years ago.

He operated upon a person who had long had a hydrocele; and his mode of performing the operation was, by excision of the tunica vaginalis. He found his knife resisted by earthy matter in one part of the tunic; but he succeeded in removing it. I dried the portion which he removed, and found several deposits of earth in it. I showed it, after an evening's lecture on surgery, to Mr. Hunter, who, after examining it, laughingly said, "I thank you, Sir," and put it into his pocket.

A beautiful specimen of this disease in the tunica vaginalis may be seen in the Museum at Guy's Hospital; but of this more hereafter, as the diseases of that tunic, are not at present, my object for consideration.

The tunica albuginea, which is a tendinous structure, is more frequently affected with this complaint than the tunica vaginalis.

Little patches of cartilage, and of earth, are often seen between the tunica vaginalis, testis, and the tunica albuginea.

The greater part of the tunica albuginea is also sometimes entirely covered, as well as interstitially loaded, with earthy matter, of which an excellent example may be seen in the collection of preparations at Guy's Hospital.

When a hardness is left by chronic inflammation at each extremity of the epididymis, earthy matter is sometimes found in such swellings of the globus major or minor; and a view of an epididymis in this state I have given in Plate XIII., being the most frequent seat of such deposits.

In very enlarged testes also, amidst the recently effused solid matter of which they are then composed, portions of cartilage are found, and in these is seated a quantity of earth.—[See Plate XIII.]

A simple chronic disease of long continuance, and subjected to the consequent changes of the constitution, will sometimes undergo, such alterations, that various appearances will be found developed, exhibiting a pulpy substance in one situation, encysted growths in another, and cartilaginous, with ossific depositions, in a third, of which, the following case offers a good illustration.

CASE.

James Verrail, aged 26, a musician in one of the Theatres, in the Spring of 1823, contracted a gonorrhœa for the fourth time, which in three or four weeks gave rise to an inflammation and enlargement of the testis, to which he applied evaporating lotions, and abstained from any exertion, by these means he reduced the inflammatory symptoms; but the testicle still remained hard, and much larger, than in its natural state.

He then returned to his usual mode of living, which was very irregular, and in the following October the testicle became further enlarged, particularly at the posterior part; and it continued gradually to increase in size, until his admission into St. Thomas's Hospital, on April 8th, 1824, under the care of Mr. Tyrrell.

The following is an account of the symptoms and appearances at that time. His countenance was sallow, his secretions irregular, there was much constitutional derangement, and occasional severe pain in the affected part, extending to the loins.

The testicle was about the size of a large orange, somewhat uneven upon its surface, feeling extremely hard in some parts, and in others, soft, and fluctuating.

The usual remedies for chronic disease in this organ were employed, without producing any alteration in the complaint;

and therefore, with the concurrence of his colleagues, Mr. Tyrrell consented to its removal.

He did this in the usual manner; and when he examined the diseased testis, after its removal, he found the substance of the gland, converted into a soft pulpy or medullary matter, in the centre of which was a small abscess. The epididymis presented a hard mass like scirrhus, had numerous portions of cartilage deposited in it, and at its upper part was a bunch of hydatids.

After the operation he had a severe attack of peritonitis, which was subdued by active treatment; and he left the Hospital much improved in health, and with the wound quite closed.

These cartilaginous and ossific deposits, whether in the membranes, or in the substance of the testicle, admit of no relief from medical or surgical treatment.

The operation of removing the part is not in general required for them, as they remain for many years in an indolent state; and unless the testicle becomes enlarged, and inconvenient from its bulk, or threaten a malignant disposition, its removal is not absolutely required; for I believe that such deposits are more frequently the effect of long-continued simple chronic inflammation, and of change of structure from age, like the earthy deposits on the blood-vessels, than the result of a malignant action in the part; and, therefore, they of themselves do not require an operation, but demand it only, when united with diseases of a more serious tendency, or when the enlargement produces a degree of inconvenience which makes the patient anxiously request its removal.

CHAPTER X.

THE FUNGOID DISEASE OF THE TESTICLE.

THE testis is often the subject of a malignant disease, which I shall call *fungoid*, but which has been described by different authors under the terms of *pulpy*, *medullary*, *soft cancer*, and *fungus hematodes*.

A multiplicity of names, to designate the same thing, is always a disadvantage, nor can I better point out the folly of such a nomenclature, than by quoting the expression of a learned judge, who, in trying a medical case, heard one evidence speak of cellular membrane, a second cellular tissue, and a third of reticular membrane; " What!" said his lordship, " three names for the same structure! how absurd, how confusing!"

The term *fungus* is most applicable to the disease: because, when it ulcerates, it forms a large fungoid projection; which being full of blood, bleeds freely from the slightest laceration, as well as often spontaneously. It has been called *medullary*, from its having somewhat the appearance of the substance of the brain; *pulpy*, because of the softness of its texture; and *soft cancer*, because it has somewhat of the cancerous character, in extending in the course of the absorbent vessels, indicated by its affecting other structures; but as a multitude of names for the same thing serve only to confuse, and as simplicity is the very soul of Surgery, I shall confine the appellation to *fungus* or *fungoid* disease of the testicle.

The symptoms of this inflammation are as follow. It begins with an enlargement of the body of the testis, which is at first accompanied with great hardness, so that it might be mistaken for *scirrhus* in the first instance; and the enlargement extends rather quickly through the body of the testis, so that in three or four months the whole of the testis will become diseased.

It then affects the epididymis, from one extremity to the other.

Whilst the complaint is confined to the testis, the swelling is globular; but when the epididymis is also diseased, it becomes pyriform, and has so much the form of hydrocele, as to be easily, at first sight, mistaken for it. This deception is rendered the more likely, as a small quantity of water is often effused, so that the complaint has been called hydro-sarcocele. When carefully examined by manipulation, the solid swelling is felt through the water, and the sides are found flatter than its anterior surface, which is the form of the testicle in its natural state. The surface of the testicle subsequently becomes uneven; but this symptom, is not a concomitant of this disease in its early stages.

At first, the complaint is not attended with pain; but it is soon followed by occasional darting sensations in the part, and in the course of the spermatic cord, to the groin and loins; and if it be much handled, it leaves a tenderness and increased pain, in the part for a considerable time.

Its growth is very uncertain: it sometimes increases rapidly, and soon acquires a great size; at others, eight or ten months may elapse before the swelling becomes considerable.

It generally does not grow steadily and equally, but without any apparent cause becomes very painful for two or three days, and during that time rapidly increases; and then is again stationary, for two or three weeks.

Slight causes augment it; for when it has been tranquil for some time, a catarrh will render it painful, and suddenly increase it; or more than usual exercise, will light up in it fresh inflammation, and induce the progress of the disease.

At first, the scrotum does not undergo any change in colour, or the spermatic cord appear increased in size; but subsequently the veins of the latter, become enlarged, producing slight varicocele.

The constitution of the patient appears to be but little affected;

upon minute inquiry, however, some of the secretions will generally be found defective; the appetite lessened, the bowels costive, and the motions deficient in bile.

Upon further inquiry, it will be often found that some disappointment, suspense, or anxiety of mind, has for some time existed and proved the exciting cause of the disease.

These, then, are the symptoms of the first stage of the complaint.

In the second stage, the patient appears before the Surgeon with his scrotum covered by varicose veins, and the testis, instead of being hard, yields to pressure, so as to lead to a belief in the presence of fluid; the pyriform appearance of the swelling further induces a suspicion of its being hydrocele; and this mistake is the more readily made, as the secretion of serum increases with the progress of the disease, being the effect of the irritation.

The patient now complains of occasional darting pains through the part, tenderness on pressure of the testis, and uneasiness in his back.

The spermatic cord becomes thickened to the abdominal ring, and the veins are fuller than natural. The patient's countenance is sallow; but in the centre of the cheek there is a small fixed blush. The bowels are sometimes constipated, and at others there is a profuse diarrhœa, by which the symptoms are for a moment relieved. The appetite is less than usual; rest is frequently disturbed by pain and irritation; and the body becomes emaciated, evincing by these symptoms a general constitutional derangement.

In the third stage of this complaint, the testicle contracts an adhesion to the scrotum, and consequently the skin ceases to move readily over it.

An absorbent gland, or the glands of the groin on the diseased side enlarge, from irritation; and when many glands are affected on that side, the other groin sometimes participates in the enlargement. Opposite to the adhesion of the scrotum, the testis appears knotted and unequal upon its surface; and similar inequalities in other parts of the testicle may generally be observed.

The spermatic cord next becomes enlarged, contracted, hardened, and varicose; and sometimes forms such an adhesion to the pubes, that the testicle from these abnormal connections loses its mobility.

The veins of the scrotum not only enlarge, but a purple blush soon appears on some part of it, where a sense of fluctuation is apparently so distinct, that the Surgeon puts his lancet into it, and is surprised to find only blood issue from a spongy structure, instead of a flow of serum as he had expected.

Although the wound thus made readily heals, yet soon after, ulceration ensues, and a fungus projects, bleeds, and exudes a large quantity of serum, which has a peculiarly faint odour. The fungus spreads in two or three weeks, to the breadth of the palm of the hand, having a great tendency to slough, emitting an offensive odour, and at intervals attended with considerable pain, which is not, however, increased by the touch; if the testicle be compressed, a brain-like substance issues from the fungus. At length, incapable of supporting these various calls upon the constitution, the patient sinks from hemorrhage, serous discharge, and continued irritation.

But ulceration does not always form the sequel of this disease, for, generally, its progress is marked by tuberculated enlargement along the course of the spermatic cord, which may be traced to a tumour situated just below the kidney, and which is rendered very perceptible by placing the patient in such a position as relaxes the abdominal muscles. The pain now becomes very acute, and the patient is frequently afflicted with colic, attended with nausea and vomiting, which symptoms are much increased when taking food into the stomach. He is next attacked with severe diarrhœa, and loss of appetite; his countenance betrays the existence of malignant disease, for it is wan, and his eyes are yellow; he becomes excessively emaciated; his thighs and legs swell, first upon the diseased, and then on both sides, accompanied by pricking pains; his abdomen is enlarged, and he has hiccough; his pulse becomes excessively quick, he has profuse perspiration, and at length he sinks, under the severity of constitutional irritation.

The time which is occupied in this struggle, varies extremely in different persons. If the disease be from the first malignant, he dies within twelve months from the first attack; but it is sometimes simply chronic at the commencement, and degenerates into malignancy, and then years may elapse after the enlargement, before the patient is ultimately destroyed.

ON THE DISSECTION OF THE FUNGOID DISEASE.

I have mentioned that this complaint is in its commencement excessively hard; and when it is examined by dissection, the effusion, in the first stage of the disease, is found occupying only a part of the substance of the testicle. In the case of a patient of Dr. Blackman, of Ramsbury, hereafter described, the disease had existed only four months, before it was removed and dissected.

I found the excessive hardness did not arise from the very solid nature of the substance effused, but from the excessive distension of the tunica albuginea, and from its not readily yielding to the pressure from within. The substance which was effused was fibrous, of a yellowish white colour tinged with blood, partially vascular, and when macerated, it became flocculent, and had the appearance of matted wool. The seminiferous tubes ceased to be demonstrable at that part of the testis, but in other parts, they remained entire.

In the dissection of the testis in the second stage of the disorder, it is found filled with a similar soft, and white fibrous matter, which occupies not only the testis but also the epididymis, and these parts readily yield to pressure.

Intermixed with this soft effusion the product of the malignant action, there is found a yellow fibrinous substance, or "coagulated lymph," the result of the common inflammation which had proceeded with the specific disease.

When a testicle has been macerated in this state, the soft fibrine of the disease is removed, and leaves the tendinous septa of the testis, in which it had been enclosed, as a kind of cellular structure, in which the adventitious matter had been deposited, and supported.

In the third and last stage, when the testis has been excessively enlarged, the tunica vaginalis is found to contain a considerable quantity of water; the tunica albuginea to have given way, and a portion of the disease projecting through it within the scrotum; at this period it is, that the absorbent glands in the groin become affected, and the surface of the testicle to be irregular and knotted.

The interior of the testis contains cysts of serum, coagulated blood, and a white soft fibrous matter, which, when compressed, exudes a substance like cream, tinged with blood, which has been compared to putrid brain, and led to the appellation of medullary disease.

If the scrotum itself has been ulcerated, then a fungus of the same material, as that which composes the diseased organ, projects through it, and is found to spring from the interior of the testicle.

The epididymis is enlarged, and the tunica vaginalis adheres to the testicle where serum has not been effused.

The spermatic cord is excessively enlarged, indurated, and tuberculated, from the diseased secretion, being irregularly deposited; but even in some fatal cases, the cord, upon dissection, does not appear to have been implicated. A quantity of serum is usually found in the abdomen. Behind the duodenum, a large tumour frequently exists, to which that intestine adheres on the fore-part, and the aorta and vena cava are placed behind it. I have seen it in different subjects of a size, from that of the clenched hand, to the head of a child. When cut into, it contains a soft, but still a solid fibrine, with which is intermixed a fluid like cream, slightly tinged with blood.

In some persons the tumour in the abdomen begins from the lower part of the loins, and extends to the diaphragm, involving the kidney; and when it is attempted to be dissected, a large quantity of a thick cream-like matter bursts from it, at different parts.

The aorta and vena cava are generally under these circumstances diseased, and fungous tubercles, and effusion are produced in their coats, and sometimes similar effusions are deposited into the interior of the aorta.

The mesenteric glands in many of these cases are enlarged and similarly diseased.

The omentum in some persons is thickened and puckered up.

In the liver there are generally tubercles; and in a child who died of this disease, the liver was loaded with tubercles. I lent a drawing of them to Dr. Farre, who has had them engraved in his Work on the Liver.

In the collection at St. Thomas's Hospital is a preparation of the thoracic duct obliterated by this disease, and at one part forming a tubercle as large as a walnut. (See " Medical Records and Researches.")

This disease differs in its appearance from common inflammation, in soft fibrine being effused, instead of the healthy solid fibrine of the blood.

The texture of the effused matter allows of its being organized in some parts, but in others it is too soft, to support the blood-vessels which shoot into it; and blood becomes extravasated and coagulated in the fibrine.

In some parts also serum is effused, and cysts are formed, which contain a fungus within them.

When injection is thrown in by the arteries, and sections are made of the disease, some parts are coloured by the injection, while others remain entirely free from it, as if unorganized.

When injection is thrown in by the veins, they are found very large, and varicose.

If the fungus which the disease produces, be carefully examined, during the life of the patient, some parts will be found to bleed from the slightest touch, in consequence of the tenderness of the coats of the vessels, allowing them to easily break down; while other parts slough, from their want of organization.

It is a mistake to suppose that the arteries surrounding the disease are greatly enlarged; for when the neighbouring parts are cut into, the vessels are not greatly, although somewhat increased; but they bleed profusely from the tenderness of their coats and the loss of their contractile powers.

To observe these diseased changes in the best manner, the part should be injected and macerated; then the soft and thickened fibrine will be separated, and the vessels, with the tissue which supported both, will be readily demonstrable.

OF THE CAUSE OF THIS DISEASE.

This disease is constitutional or local. It is sometimes founded in a constitution naturally feeble, and therefore originally prone to disease. I have seen it in infancy, in children possessing a high degree of scrofulous diathesis; and even in the cases, when it occurs in the adult, it has generally affected those of a strumous habit of body. It does, however, sometimes occur in those who have been originally healthy, but whose constitutions have been broken down by anxiety, and suspense of mind, by habits of excessive intemperance, by over-exertions of mind and body, and want of attention to the due performance of the natural secretions. Of such conditions a slight feverish state is the consequence, the tongue becomes white, and streaked with yellow in its middle; the appetite and the digestion defective, probably from the secretion of gastric juice being unnatural; the bowels are costive, from a defect in their secretions; the bile is absorbed instead of being poured into the intestines, and the eye is consequently yellow; the pulse quick; the cheek flushed, whilst the skin is otherwise sallow; the nervous system becomes irritable, and the patient has no longer comfortable and composing rest.

In this state of constitution a slight bruise or sprain, or any cause of irritation, is liable to produce an unhealthy local action, and peculiar and unnatural adventitious depositions are frequently the consequence.

When the local disease has existed for some time, the absorbents become irritated, and they convey the diseased action to their glands, from the irritation increasing their power of absorption: other structures then become affected, and similar diseases occur even out of the line of absorbent irritation, as if the blood had become tainted with the malignant matter; and then the disease attacks various parts of the body; for the same constitution will produce the local action even under accidental, if continued irritation.

That the disease is depending on both constitutional and local action, is shown by the following facts; that there is a disposition to its formation in various parts of the body at the same time, proving its constitutional origin; and that there is also a peculiarity in the local action, is proved, from the wound caused by the extirpation of the diseased part, often healing in the kindest manner; yet afterwards, the complaint recurs, either in the spermatic cord or some other part of the body; which is a proof that the local action differs from common inflammation: and that, when the disease returns, it is after common inflammation, has ceased.

The state of the blood also favours the production of the disease; for, in some persons at least, it occasionally happens that the blood drawn from the arm, or from the fungus disease itself, coagulates very weakly, from want of healthy fibrine; and the serum is large in quantity, and of a deep yellow colour.

OF THE DIAGNOSIS OF THIS DISEASE.

From hydrocele it is often difficult to distinguish it, especially if in that disease, the fluid be opaque, or the tunica vaginalis be greatly thickened; but in a very large proportion of cases hydrocele is transparent, and therefore it is only required to press the fluid to the fore-part of the tunica vaginalis, and to render the scrotum very tense, when the fluid may be seen, either by the sun's rays falling through the part, or by the light of a candle, in a room otherwise darkened. Besides, the fungoid disease, in its second and third stages, yields, like dough rather than fluctuates; but still the distinction is sometimes difficult, and all candid persons will confess they have erred, and when they have believed it water, have found it solid. Mr. Pott, Mr. Hunter, Mr. Cline, and many others have been thus deceived; and I am ready to confess that I have more than once been mistaken.

It is my advice, therefore, in all cases of doubt, to make a small incision into the scrotum, and then to puncture the tunica vaginalis, which will at once relieve the mind of doubt; and this should always be done before the operation of castration is performed.

From the hydatid testis, it can be only distinguished by the occasional pain attending the fungus disease, by the sallow complexion of the patient, and by the loss, of the general health, for in the hydatid disease, the health remains perfect; but as each malady requires the removal of the part, the diagnosis is of less importance.

The excessive hardness at the first, and the yielding or obscure fluctuation of fungus, in the second stage of the disease, distinguish it from the chronic enlargement of the testis.

TREATMENT.

When this complaint is once formed, no medical or local treatment, in the present state of our knowledge, seems to have any influence in curing it. Improving the general health may delay the fatal termination of the case, and the diminution of local increased action may retard the progress of the complaint, or lessen its violence; but more is not to be expected.

Instead, therefore, of having recourse to medicines, which have always hitherto failed, it behoves medical men to direct their minds to the trial of the numerous agents, which Chemistry and

Botany, have of late, so abundantly discovered and simplified, and a store of which, is always accessible.

The Pil: Hydr: Sub: Compos:, the Compound Decoction of Sarsaparilla, and the application of leeches, are the means which Surgeons have one after another advised, without any further advantage than a little to improve the health, and lessen the severity of the symptoms.

Therefore there is reason to believe that whatever can in future remove the disease, must have a specific or peculiar power: and that the mere lessening an augmented, or increasing an enfeebled action, will do but little towards a cure.

Those medicines, therefore, that have been tried, and failed, should be put aside as useless, and a new one sought in the tribe of medicines recently discovered, or newly combined.

But although we have no remedy at present for the cure of this disease, it is right either before, or immediately after an operation is performed for its removal, to give such medicines as shall alter the constitution, and bring it into a state, to prevent the same local action being regenerated, either upon the parts adjacent, or on other parts of the body.

For this purpose Calomel and Opium in considerable doses, should be given at night, and the compound Infusion of Gentian or Columba with Soda and Rhubarb will be found of considerable benefit.

As to local treatment, evaporating lotions, and the frequent use of leeches, are the best means of temporary relief.

But so soon as it is certain that the complaint is of a fungous nature, no time should be wasted in the endeavour to subdue the malignant action by medicinal remedies; it may, however, be necessary, to strengthen the patient to enable him to bear the extirpation of the disease, and immediately as this object is effected the operation should be at once performed, and then constitutional and alterative medicines should be administered for several weeks after.

Of all the operations of Surgery, there is scarcely any which is so generally unsuccessful as that of castration for fungoid disease, and not from the danger attending its performance, but from the malignity of the malady; and there is no hope of the patient's life being saved, unless the operation be performed so soon as the nature of the complaint is ascertained.

For this purpose, it is my advice that the treatment which I have recommended for the simple chronic disease, be fairly tried as long as any doubt remains as to the true nature of the complaint. Calomel and Opium should be given for a month or six weeks, so that the salivary glands may be considerably affected. Let evaporating lotions and leeches be applied, and the recumbent posture be steadily observed; and if the disease does not yield to this plan, perseveringly followed for six weeks, no other with which I am acquainted, offers any prospect of success; and the operation should be performed directly the patient has recovered from the effects of the Mercury; for erysipelas is apt to follow the operation, if it be attempted while the constitution is under the influence of that metal.

But if the testis has been suffered to grow large—if the spermatic cord be diseased, apparently only to the abdominal ring—if the appetite be impaired—if there be occasional vomiting—if there be sometimes severe pain in the abdomen, with increased tenderness upon pressure, diarrhœa at one time, and obstinate costiveness at another, although, no tumour can be felt, still the disease will manifest itself in some other part of the body after the extirpation of the testicle.

One reason that this operation is so unsuccessful, is the delay of its performance, from the natural aversion to an operation, and from the anxiety to preserve this important part in particular:—hence trial after trial is made, of constitutional and local treatment, until that period is passed, at which castration could be useful.

My opinion is, that more than three months from the commencement of the disease should not elapse, before the operation be resorted to, if the remedies above mentioned have been fairly tried; for in the case hereafter mentioned, from Dr. Blackman, the operation was unsuccessful, although performed four months after the first discovery of the disease, and before the whole testis was affected.

When this complaint attacks other structures, the same disposition to reproduction, manifests itself. A Miss G—— was under the care of Mr. Saunders for a fungous disease of the eye; and so soon as it was certain the disease was of this nature, he removed the organ. Yet some weeks after, she showed herself to me, and I found a little fungus projecting between the eye-lids, which I pressed away. She had afterwards tubercles form in various parts of the body, of which she died.

The medicine which of all others, in my experience, I have seen of use in diseases which appeared to be of this nature, (but which, from the beneficial effects of the remedy, may be reasonably doubted,) is the Bichloridum Hydrargyri, given to an extent gently to affect the salivary glands, and continued for a length of time, combined with the Tincture of Bark and Rhubarb, or with the Concentrated Decoction of Sarsaparilla.

If the operation be performed for this disease, the Surgeon should never trust solely to the removal of the complaint by the knife; but he must endeavour to alter the constitution which has not only led to the complaint, but will surely regenerate it, if it remain unchanged.

CASE I.

December 7th, 1807.—I removed the right testis of Mr. A—, of Worcester, for fungoid disease.

December 8th.—He had some irritative fever, and great debility; I ordered him to take the Liquor Ammon: Acet: For a fortnight after, he proceeded well; when an abscess formed in the course of the spermatic cord, and a fungous growth appeared at its divided extremity, where the ligature had been applied. Fomentations and poultices were recommended; and in a month, the wound was nearly, but not quite closed.

January 11th, 1808.—The wound was healed, but he was much reduced, and I advised his going into the country.

February 1st.—He remained in the country only eleven days; when he informed, me that having weighed himself carefully before going, on his return found, he had increased 13 lb.; indeed his appearance indicated a great increase of size, for he had been previously excessively reduced: notwithstanding this improvement he complained of slight pain in his abdomen.

February 10th.—He called upon me with a swelling in his scrotum; and when I pressed the part, a brain-like substance issued, of a pulpy consistence, and of a brownish red colour, upon which the swelling subsided. A lotion of the Sulphate of

Copper was ordered, in the proportion of three grains to four ounces of rose-water.

The pain remained in his abdomen, but his health appeared good.

21st.—A fungous tumour again formed in the scrotum, and between the edges of the wound. It grew rapidly. The ulcer had everted edges, and a fungous surface; a hard swelling surrounded it. He had pain in his stomach, and appeared as sallow as he had been before the operation.

March 1st.—In the wound of the scrotum, opposite the end of the cord, a fungus, had again arisen, which in a week increased from the size of a marble, to that of a French walnut.

I immediately removed it, but with some difficulty, as it adhered to the tunica vaginalis of the other testicle; on which side he had also a hernia.

5th.—Complained of great pain in his stomach after eating.

6th.—Still pain in his stomach after taking any kind of food, even tea; and whether it was a solid, or fluid, the same effect was produced.

A tumour could now be perceived on the right side of the abdomen, above the level of the navel.

His pain was only mitigated by the use of Opium.

16th.—He was attacked yesterday with violent pain in his stomach, and with vomiting. He had omitted a night draught, with Opium, and had no sleep at night, but which he attributed to his having taken a good deal of exercise the day before: the wound was nearly healed. I ordered some purgative medicine, and Opium after it.

April 3rd.—He complained of nausea, and frequently vomited; he felt faint; his pulse was extremely rapid, being 130 in a minute; he had constant uneasiness in the abdomen, with symptoms of cardialgia; and no kind of food agreed with him.

10th.—I recommended him to remove to Islington, which he did, but without any alteration of his symptoms. He still suffered from faintness. He was pale—had a quick pulse—and had the heartburn. He took light food, was restless, and vomited two or three times a day. He could not sleep for four nights after his removal into the country.

22nd.—He sent for me, on account of his having a swelling in his leg and thigh, upon the side of the operation.

May 2nd.—I found him very much reduced in appearance, although his leg and thigh were not so much swollen; but the foot was still greatly enlarged. He vomited frequently; had hiccough, but, according to his account, not so violent as it had been.

20th.—He has been gradually sinking since the last report.

A week ago he was seized with a diarrhœa, and involuntary discharge of fæces; but this was soon checked by Pulv: Ipecac: Comp. His hiccough continued, but was less violent. The vomiting recurred every day, and sometimes more than once in twenty-four hours. The pain in the abdomen returned in more frequent paroxysms; and a tumour could be felt in the region of the kidney.

He died this morning. Just before his death he became quite easy; and even at the time his extremities were cold, he said he felt as if he could walk down stairs. All his painful bodily feelings had ceased; and his mind continued energetic. He was most excessively emaciated, from the constant irritation of the disease, and was worn out by the immoderately quick action of the heart.

He had lately been the subject of frequent rigors, succeeded by heat; and his left leg began to swell a short time before his death.

DISSECTION.

The spermatic cord did not appear to be diseased.

A tumour was found behind the duodenum, to which that intestine adhered; and to the posterior part of the swelling, the vena cava and aorta were attached.

The tumour in the loins was as large as the head of a child.

It contained in part, a white fibrous substance, and in other parts there were portions resembling brain in different degrees of putrefaction: when the more solid substance was squeezed, there issued from it a fluid, like cream, tinged with blood.

Many of the mesenteric glands were enlarged.

The thoracic duct was in a sound state.

The aorta and vena cava were greatly diseased, each of them were tuberculated, and the aorta, was nearly closed by a fungous secretion.—[See Plate VI. fig. 2, and Plate IX.]

CASE II.

The following case was sent to me by Dr. Blackman, of Ramsbury, in December, 1807.

Mr. ——, of Ramsbury, Wilts, between three and four months ago, had an uneasy sensation in the right testicle, upon touching it at its upper part. It then began to grow large, to feel heavy, and it became excessively hard.

He had no pains in his loins, and in the testis had only a sense of weight, unless it were pressed; but within these few days he has had some pain in his groin.

The testis was treble its natural size: its hardness excessive, for it felt like marble.

His appetite was good, but he looked sallow, and had a fixed blush in the centre of the cheek.

His age was 46.

The swelling increased by exercise, and he then felt some pain in the testicle.

I advised an immediate operation, which was performed by me in the usual manner, on the day following his arrival in London, December 21. The wound healed quickly, and he returned apparently quite well to Ramsbury on January 13, 180

The day after the operation I examined the testis, and found both the body of that organ, and the epididymis in a pulpy state, filled with a soft fibrine, of a yellowish white in the greater part, but in other parts, it was coloured by blood; the hardness of the testis had arisen from the excessive distension of the tunica albuginea.

It was very unequally organized. I threw quicksilver into the vas deferens, and it proceeded as far as the beginning of the epididymis, or termination of the vas deferens, and would pass no further.

Dr. Blackman informed me that a few months after this person's return into the country, he died of vomiting, swelling of the legs and thighs, violent pain in the abdomen, hiccough, sallow countenance, abdominal tumour, and great tenderness upon pressure of the abdomen.

CASE III.

James Watson, aged 40, was admitted into Guy's Hospital, on account of a fungous disease of the left testis, which it was thought right immediately to remove. The wound healed readily, and he was discharged in the following month.

In about ten weeks after he had left the Hospital, he was attacked with severe shooting and cutting pains, commencing in that part of the cord from which the testis had been separated, and passing from thence into the groin, and around the loins.

The pains were sometimes felt in the right groin, in the loins, and over the pubes; they were not constant, but occurred only once in a week or ten days.

When the pains were most severe, he had sickness, but no vomiting. He was again admitted into Guy's Hospital. The divided end of the spermatic cord was somewhat enlarged, felt very hard, and was very painful, when pressed.

The skin of the scrotum did not adhere.

The tumour in the inguinal canal gradually enlarged, and in two months he complained of pain in the abdomen, upon pressure. A large tumour could be felt on the lower part of the left side of the sygmoid flexion of the colon, extending towards the region of the kidney.

There could also be felt on that side, another tumour of considerable size, reaching towards the diaphragm. They both were painful, particularly upon pressure.

They gradually increased in size.

He became much emaciated, lost his appetite, and for two weeks prior to his death he had a constant and severe diarrhœa, which every medicine failed to check.

He died exhausted by continued irritation.

INSPECTION.

Upon dividing the scrotum on the left side, a soft, white, pulpy tumour was found at the end of the remaining part of the spermatic cord, as large as a walnut.

The cord was thickened as it ascended into the abdomen, and where it entered that cavity it was of considerable size; a large mass of the same description of adventitious matter firmly adhered to the peritoneum, at the lower part of the abdomen.

When the abdominal muscles were turned back, an immense tumour was seen, reaching from the edge of the pelvis, nearly up to the diaphragm. It almost filled the cavity of the abdomen on that side; the large intestines and colon passed over it; it completely enveloped the aorta, and vena cava; and the left kidney was so involved in the diseased mass, that its functions must have been in a great measure impaired, if not entirely destroyed.

In removing the tumour, it was accidentally cut into, and torn in two or three parts, and from these lacerations there issued an unhealthy kind of suppuration, or curd-like matter, about the consistence of very thick cream, of a pale white colour, and tinged with blood.

A considerable number of the mesenteric glands were enlarged.

The liver had two small white tubercles in its substancc; the other organs of the cavity, were free from disease.

None of the viscera of the chest were affected by the complaint.

The thoracic duct was healthy; but there was a small gland attached to it, which appeared to have been tainted with the same diseased action. Vide Plate VI. fig. 1.

Copy of a Letter from Mr. Lunn, of Rotherham.

CASE IV.

" March 26, 1809.—A man, aged 48 years, of a scorbutic habit, but otherwise enjoying moderate health, by trade a *Borer*, requested my attendance for a disease of his right testicle. I found him in bed, supporting the scrotum by a pillow, complaining of great pain in his loins, and now and then in the body of the testicle. On my first examination, I believed the case to be hydrocele of the tunica vaginalis, as in form and figure it corresponded with that disease. The scrotum was healthy, and a good deal stretched, and presenting a fine vascular net-work upon its surface from the mere distention of the skin. A fluctuation was evident; in short, we had every symptom of hydrocele excepting the transparency; and the loss of this important symptom I thought might probably be attributed to some slight accident in his laborious employment, which had ruptured one or more of the small blood-vessels, and by extravasation of blood rendered the tumour opaque. I was confident there must be a considerable quantity of fluid, so as to warrant my making a puncture, which I did with a lancet, and discharged about six ounces of colourless serum. I now had an opportunity of learning the true nature of the complaint. The testis was enlarged, yielding to pressure, even on its surface; in no way irritable; moderate pressure gave no pain; the spermatic cord was a little thickened by a varicose affection of the veins, but not at all indurated; the vas deferens perfectly sound; the size of the testis about four inches long, and six or seven in circumference. With these appearances I gave it as my opinion, that he must only expect a radical cure from a removal of the disease. The discharge of the water, and a suspensory bandage, afforded so much relief, that the poor fellow was in a day or two able to resume his work; and, anxious to put off the evil day, he desired me to use some milder remedy before I thought of an operation. Cicuta, Mercury, and leeches were used for a month, when I was again requested to ride over and draw off the water.

" April 27th.—I found him much as in his former state, with an increased pain, both in the back, and body of the testicle. I repeated the puncture, and discharged nearly a pint of fluid. The testis had increased in size and sensibility, with a degree of unevenness on its surface. The cord continued in the state as before described.

" I now spoke again of an immediate removal, or otherwise to relinquish the idea altogether. He saw the truth of my observations, and seemed anxious to have it done.

" April 30.—I performed the operation in the usual manner, by making a longitudinal incision from a little below the abdominal ring, to nearly the bottom of the scrotum. I then dissected out the testicle, passed a tourniquet of linen round the cord, which I divided high up, and secured the bleeding vessels separately. I then drew the lips of the wound together by sutures, and applied a pledget of soft cerate; the sutures separated at the usual period, and in eighteen days the patient was quite well.

All this wore a pleasing aspect, the patient was grateful and the Surgeon satisfied. He continued perfectly free from pain and apparent disease till August 9th, 1810, when I was again desired to see him. He complained of violent pain in his back, which he described to be of the same kind as before the operation; but a brisk drastic purge of Scammony and Calomel removed it wholly.

" September 7th.—He relapsed, and sent again for his medicine, which relieved him for a few weeks. The untoward symptoms again gradually increased. He complained of great weakness, and numbness in his right leg, first attended with œdematous swelling of the limb, and a smarting pain at the cicatrix, but which, to the day of his death, never appeared particularly affected. In a few weeks the left leg became swelled and painful; and afterwards, the cellular membrane about the buttocks, belly, and chest, penis and scrotum, were distended with a preternatural quantity of interstitial fluid, which, from its mere mechanical pressure, was very distressing to the patient. The anus became nearly closed, and stools could only be procured by cathartics or enemata. To relieve these distressing and fatal symptoms, a long list of medicaments were tried, *viz.* Saturnine Lotions and Cerate; when the limbs were very painful, Friction; Cicuta, Arsenic, Digitalis, Calomel, Opium, Blisters, Bark, and Steel, joined with Diuretics, Æther, &c.; but there was too good reason to see the inefficacy of all these remedies, for the disease continued unmitigated, and he died, greatly emaciated and in extreme pain, on the 22nd of February, 1811, after surviving the operation a year and ten months.

"I will now give an account of the dissection. Being very anxious to inspect the body, I obtained leave; and although I could only make a very partial examination of the abdominal viscera, yet it was sufficient to convince any man how impossible it was that any treatment could even have given relief. Before I proceed to the description of the dissection, let me observe, it was done in the presence of a most respectable Physician, and Surgeon; the former attended with me in the poor man's last illness.

DISSECTION.

"On making a crucial incision of the parietes of the abdomen, which were in a thickened state, several pints of brown serum issued out. The omentum was corrugated, hard, and knotty, not covering the intestines below the umbilicus, and from half an inch to an inch in thickness; it had somewhat the puckered appearance of a cancerous mamma. The small intestines, excepting some livid and inflammatory spots, were healthy; but the large ones were in a very different state; their coats were universally thickened, and with the same spotted appearance as the omentum ; and from the firm adhesions to the surrounding parts, and to each other, they must have been in a high inflammatory state, at one time or other. The cæcum was united to, and buried in, the enlarged iliac glands on the right side ; and the glands on the left were likewise greatly enlarged, and in a state of suppuration. The colon also disappeared at its sigmoid flexure, forming an heterogeneous mass, with the lumbar glands, and extending into the pelvis, presented a tumour, about the circumference, and length of a man's fore-arm, which, on being opened, poured forth a large quantity of thick pus, and curdy matter. The rectum could only be felt as involved with such an accumulation of disease as few people I believe have either witnessed or could credit ; and every gland within the pelvis partook more or less of this horrid complaint. The mesenteric glands were in all stages of the disease, and of all sizes. From the necessary incisions in the dissection, matter poured out in all directions, so that the pelvis was frequently filled with it ; some of the glands cut like cream-cheese. The bladder was empty, and seemed free from disease. Liver and stomach but little affected. Gall-bladder greatly dilated with bile, but sound. The lumbar glands were astonishingly enlarged ; they contained above a pint of pus and curdy matter. I observed the contents of all the glands had a peculiar whiteness, a good deal like white paint made rather thin.

" In this dissection, as in almost all others in the country, we were obliged to pass over many parts unexamined. The idea of the body of a deceased friend being opened is always repugnant to their feelings, and in their judgment not necessary. It is by the very dint of perseverance, leave can ever be obtained to peep at the disease, however interesting; and I lament to say, in many important disorders, the greatest exertion of the Surgeon, availeth nothing. But in the case just related, though I had not an opportunity of making a minute examination, yet I saw sufficient to convince me how impossible it was to cure the patient, or to have prevented the complaint. I think there is not a doubt but the testicle was first affected; and probably had it been removed a year sooner, while it was, perhaps, only a local affection, it might have effectually cured the disease; but as there is no doubt the glands within the pelvis were slightly affected at the time the testicle was removed, it is not probable that the patient's life was prolonged by the operation.

" I remain, Sir,
" Your obedient, humble Servant,
" March 20, 1811. " WILLIAM LUNN."

" N.B. In the dissection, not a vestige of the cord on the right side was to be found."

CASE V.

Mr. ——, aged 32, who, although robust, was always of a costive habit, even when perfectly well in other respects; in the month of June, 1818, he was riding in a gig, and he injured his testicles by striking them against the seat: they both in consequence became inflamed and enlarged; but one soon subsided. The left, however, continued larger than natural, but without pain; and he procured a suspensory bandage, and travelled to the North of England, and to other places, with but little inconvenience.

In December, 1818, he had a severe blow on the enlarged testis, which he says was followed by inflammation of his bowels, and by fresh inflammation and gradual increase of the bulk of the testicle. Leeches and depletion was employed; and the swelling resisting these means, a blister was applied to the scrotum, by which the inflammation was reduced, but the enlargement of the testis continued.

He was then ordered Pil: Hydrargyri gr. x. bis die, and the compound Decoction of Sarsaparilla; but during this treatment his constitution became exceedingly affected, and without any relief to the disease. As his health continued impaired, and the testicle became so irritable, that the least inattention to diet or regimen inflamed it, he made up his mind to undergo the operation of castration, which I performed on the 20th of July, 1819.

His symptoms on the day of the operation were as follows:—

The testicle felt very heavy; it was not tender to the touch; neither did he complain of continued determined pain in it, but there had been a sensation of dragging in the left loin for the last three months. The scrotum was slightly inflamed, felt hot, and his greatest relief was from the application of cold water. The veins of the scrotum were enlarged.

The wound healed rapidly, and he was apparently well in three weeks.

In August he was seized with violent pain in his loins, which he described to be like cramp, and which bent him double. He vomited, had cold perspiration and faintness, but which was temporarily relieved by taking a large dose of Opium.

I advised him to go into the country, and for a few weeks he appeared better; but then he lost his appetite, became extremely emaciated, complained of pain in his abdomen, and in between five and six months he died.

I had no opportunity of examining his body.

CHAPTER XI.

OF THE SCIRRHOUS TESTIS.

I MUCH doubt the existence of this disease in the testicle, in the same form, and with the usual appearances, it assumes in cancer of the breast, which is so commonly attended with an excessively hard swelling intersected by a net-work of strong fibres or ligamentous bands.

In a few instances I have seen a solid enlargement commencing in the body of the testicle, of great weight and attended with severe occasional pain, feeling tuberculated, irregular, and excessively hard, and not rapidly increasing in size or producing a vascular bleeding surface, like fungoid disease.

From this state, I have known the pain to extend to the loins, the spermatic cord become enlarged, hardened, and tuberculated; a tumour form in the loins, but smaller and harder than in the fungoid disease, but still evincing a malignant character of the affection by the propagation of the similar disease in the course of the absorbents. While in this stage fluid is usually secreted into the tunica vaginalis; soon after a dropsical effusion takes place in the cellular membrane of the leg and thigh of the diseased side, which is soon followed by a similar affection of the opposite limb. Ulceration I have once seen occur, followed by a gradual wasting of the testicle, when the glands of the groin became diseased, and the man, after some months, died. But this state rarely happens; for generally, without ulceration, the patient's countenance becomes sallow, and he sinks under impaired digestion, pain and tumour in the abdomen, and an irregular state of bowels, this condition is frequently accompanied with ascites, which proves fatal. Such are the symptoms accompanying the disease of the testicle most assimilating the cancerous affections of the breast, and differing from the fungoid disease in the slowness of its progress, the hardness of the tumour, and its little liability to pass into ulceration.

DISSECTION.

On cutting into the diseased part, after its removal, water is found in the tunica vaginalis, so that there is *hydro-sarcocele*, as it used to be termed by the Surgeons of older times.

In some parts the tunica vaginalis adheres to the surface of the testis.

In the testis, instead of the seminiferous tubes, a hard white mass is found, in lobes or tubercles, little vascular; and sometimes interspersed, with small portions of cartilage, or bone.

The epididymis contains the same firm fibrous secretion; and the spermatic cord is enlarged, and has small white tubercles deposited on it.

The tumour which exists in the abdomen is of a white solid texture, very unlike that of the fungoid disease, and somewhat resembling the true scirrhous mammary tumour.

CASE.

Thomas Cheston, aged 44, who resided at Tottenham, was admitted into Guy's Hospital for an enlarged and hardened testis.

The testicle, when it first increased, was impenetrably hard: water formed around it; and the indurated mass was felt through the surrounding fluid, which, on being drawn off, amounted to four ounces.

His disease began in June, 1808; and he says he first observed a pain in his loins, and a month afterwards, hardness, and uneasiness in the testicle: it gradually increased, but the swelling never acquired any great magnitude.

The testicle and epididymis, when he was admitted into the

Hospital were both affected; but the spermatic cord was not enlarged. He had much pain in his loins, more especially in stooping. His countenance became sallow; his digestion impaired; and his thigh and leg became œdematous.

He could give no account of the cause of his disease, for he stated himself to have always been a strong muscular man, and thought he was in good health when the complaint began.

His testis was removed in March, 1809, and the wound slowly healed.

He was discharged from the Hospital as soon as it had closed, but the swelling in his leg and thigh remained, and he died a month after his return to Tottenham.

On examination of the testicle after its removal, it was found hard, white, compact, tuberculated, and in a few spots very vascular.

The epididymis was also similarly affected.

DIAGNOSIS.

This complaint is distinguished by its slow progress—by its great hardness during the whole continuance of the disease, instead of its becoming soft, like the fungoid—by its weight, and its irreguler and tuberculated feel.

Scirrhous, like the fungoid, testicle, is founded on a diseased state of the constitution, on a peculiar local action, and in a similar manner, extends by absorbent irritation.

But it is less liable to occur in different parts of the body at the same time, and is also slower in proceeding to its fatal termination.

The great difference between the two diseases probably consists in the material secreted. In the one case, it is a solid, compact fibrine, with difficulty becoming vascular, and its arteries are always small, and the veins are varicose; while in the other case, the soft fibrous mass, is highly vascular, readily bleeds, growing rapidly in some parts, too soft to support vessels in others, and in those situations admitting the extravasation of blood. Cysts of serum are sometimes interspersed with the fungoid disease, and frequently contain a fungous structure.

TREATMENT.

With respect to the efficacy of medicine whether administered with the view of improving the constitution, or locally applied, as far as my experience has gone, but little hope can be entertained of the removal of the disease, and the prognosis is as unfavourable as in fungoid affections.

The same course of medical treatment should, however be followed. Calomel and Opium should be tried, with leeches, evaporating lotions, and the recumbent posture; and if the disease does not give way to these means, it must be honestly and candidly confessed, that the further trial of medicine must be entirely experimental.

This disease however affords more time for such trials than the fungoid; yet great care must be taken not to delay the operation of castration so long as to endanger a production of the disease in the spermatic cord, or the growth of a tumour in the abdomen.

With respect to the local treatment of the fungoid and scirrhous inflammation, when they become ulcerated the object should be to produce a slough; for I have seen a very large fungoid tumour of the breast slough, and afterwards heal, and the woman discharged from the Hospital apparently well, although I cannot be certain of her remaining so: for she did not return for further advice.

Such sloughs of the fungoid projection may be produced by the application of powdered alum, sprinkled over its surface.

To cleanse the sore, remove the offensive smell, and with the object of producing a healthier surface, the Nitric Acid is a most excellent application, in the proportion of ʒj to lb. ij of distilled water.

The Chlorates of Lime and Soda are also in the same point of view highly beneficial.

CHAPTER XII.

ON THE OPERATION OF CASTRATION.

THE causes for which this operation is required, are—first, the chronic inflammation of the testis, when it has ulcerated and formed a granular swelling, by which a large proportion of the testis becomes protruded; but for slighter cases of this stage of the disease, the removal of the fungus by the knife, ligature, or escharotics, will render the operation of castration unnecessary. I have also known extirpation of the testicle required in chronic suppuration, when numerous sinuses have formed through the scrotum.

For the irritable testis the patient sometimes insists upon its removal, when the trial of medicine has proved abortive, and his sufferings are so severe and continued, that life becomes burdensome as well as useless, by preventing every pursuit.

In either of these cases the operation is unattended with danger, either at the moment or in the future; nor is it followed by any circumstances which require attention, excepting to restore the patient to his natural condition of health.

But when this operation is contemplated for the fungoid disease, it requires great judgment to decide when it shall be done, or if it should be performed at all; for it is to be recollected, that the first discovery of the disease is often not the commencement of the complaint, but that it may have existed for weeks or months: the Surgeon should therefore make strict inquiries as to the size of the tumour at the time of the discovery of the enlargement.

He should also endeavour to ascertain what was the patient's health for some time previously; if he had had pain in the loins, what he would probably call lumbago; or if he had severe dyspeptic symptoms: for this affection of the testis, is sometimes only the concomitant of the disease in the abdomen, and not its precursor. Under these circumstances an operation would avail nothing, and it would be highly injudicious to propose one.

For the following case, which offers an excellent illustration of that condition of fungoid disease of the testicle, in which an operation is not justifiable, I am indebted to Mr. Callaway, Mr. Dixon, and Mr. Bryant of Kennington, in the presence of whom I examined the patient after death.

CASE I.

“In or about the month of December, 1828, Mr. H. suffered a slight paralytic attack, which was soon removed, but was followed by considerable debility, which remained for some time; by change of air, however, and relaxation from professional duties, it was in some measure removed. In February, or the beginning of March, 1829, he again resumed his avocations, and continued to do so until September. During this time his stomach was frequently affected with loss of appetite, and eructations; and he had an irregular state of bowels, rather disposed to irritability, having rarely less than two, and sometimes three evacuations in the course of the day; frequently complaining of his loins, and an uneasy griping sensation, with a sense of fulness in the abdomen: his pulse during the whole of this time was generally, indeed I may say seldom, below 96. In the month of April he passed some purulent matter *per anum;* but this symptom did not return.

“On September 16th, 1829, Mr. H. complained suddenly of an enlargement of the right testis, with slight pain of the cord. The next morning the pain extended, and was very severe in the loins, for which he was cupped, and leeches applied over the pubes. It was at this period thought advisable to consult Sir Astley Cooper, who strongly recommended Mr. H. to remain in bed, to give up all his professional avocations, and to be again cupped on the loins. Sir Astley discovered a tumour a little above the cæcum, and upon slight pressure the patient complained of pain in the region of the kidney. The scrotum was purple, its veins much enlarged and more numerous than usual. The right testicle was at least five times, and the left about three times larger than usual, the spermatic cord on the right side was also enlarged, and in the course of the vessels within the abdomen, just below the kidney, a tumour could be felt. The right leg had began to swell about a week before Sir Astley's visit, and both testes were surrounded with water, but through which the enlarged testicle could be distinctly felt. He had slight but constant fever, attended with thirst, complained of shortness of breath upon the slightest exertion, and also after taking food. He was much debilitated, although he had persisted in attending to his business. He had also suffered from great mental anxiety for the last eighteen months. Soon after Sir Astley Cooper's visit, Mr. H. fancied that something had suddenly given way in the abdomen, when he felt relieved from the previous violent pain, although the tenderness continued: his bowels were then freely acted upon, and his symptoms mitigated. Both testes were now much enlarged, and he appeared sunk exceedingly low; his pulse about 110, and feeble.

" The tunica vaginalis was punctured by Mr. Callaway, and the fluid evacuated, which immediately coagulated. He now appeared to be gradually improving.

" October 26.—Although much reduced in flesh, and still confined to his bed, he was perfectly free from any uncomfortable feelings; his appetite good, respiration free, and he obtained rest at night. Bowels regular, and the pulse averaging about 98 or 100. He occasionlly complained of slight pain in his testes and loins. He could sit up during the day, and two or three times ventured to leave his room, and join his family below stairs. This state of symptoms continued until November 23rd, when Mr. H. found his stomach disordered, having a disinclination for food, attended with slight irritability of manner. In two or three days a febrile paroxysm supervened, ushered in by severe rigour, considerable pain in the head, flushed cheeks, and general increased heat:—pulse about 110. This would continue for four or six hours, and then subside with a moderate perspiration:—occasionally it would be profuse; he would then pass the night well, and in the morning his medical attendants would find him free from any complaint or unpleasant symptom:—his pulse was reduced to its usual standard, 98 to 100. This paroxysm returned daily, and then it became more irregular.

" Thus he continued with very little variation (except that the pulse was now rarely below 104 in the minute) until the morning of December 7, when he was seized with a slight epileptic attack whilst a friend was reading the Newspaper to him, a deep snoring, and a puffing of the cheeks (with *a very slight* alteration in the right side of the mouth, similar to a person in palsy): convulsive twitchings of the arms and legs; his pulse weakened, but not increased in numbers. Some stimuli were given him, a slight flow of tears followed, and in about ten or fifteen minutes he recovered his sensibility, but remained during the whole of the day slightly incoherent:—having increased heat, cheeks rather flushed, with a small pulse, and almost incessant talking.

"December 8.—Was completely recovered from the attack, and expressed himself that the previous day had been a perfect blank in his existence. He had now almost a daily recurrence of febrile paroxysm, but without the same distinct rigour as before; it was accompanied with great faintness, and sense of exhaustion and sinking, so that it became necessary to frequently administer some stimulus. His pulse during these attacks remained undiminished in strength, though increased in frequency; and he had several spasmodic attacks in the muscles of the arms and legs, which pressure relieved.

"Under these repeated attacks of fever, and states of exhaustion, his health rapidly gave way. He frequently complained of shooting pains in the head, for which evaporating lotions were applied; and occasionally he remained for several hours in a slight delirium. During one of these delirious attacks he had double vision:—a person passing the foot of the bed, distinctly impressed him as two figures; and when a candle was taken near him, he asked why two were used. This symptom was recollected by him on the following day. Occasionally these states of excitement were followed by a very copious perspiration, and now and then attended by an abundant discharge of urine, with slight pain on voiding it. The bowels were regular, and the secretions natural.

"Mr. H. continued to linger in this state, with frequent returns of excitement, and sense of faintness, great exhaustion with delirium, a pulse rarely below 108, which may be considered as the average for the last six weeks, until February 6th, when he died.

"For three weeks previous to his decease his bowels rarely acted without an enema; and when a fæcal discharge took place, the sense of exhaustion was so great, as to induce a belief that he could not rally."

Appearances found upon the Examination of the Body of Mr. H.

The left testis was greatly enlarged; and, in addition to its solid increase, a considerable hydrocele of the tunica vaginalis accompanied the diseased state of the organ. When the testis was cut open, it was found to be loaded internally with a soft secretion, which did not appear to be vascular, and which in many parts was in a semifluid state. The spermatic cord was apparently undiseased; but the absorbent glands in the course of the spermatic vessels were slightly enlarged, and had a white appearance internally.

The right testis was enlarged, and a hydrocele accompanied it. The testis contained a white solid matter. The spermatic cord was undiseased; but the absorbent glands were similarly diseased to those of the opposite side.

The vesiculæ seminales, prostate gland, and lower part of the vasa deferentia behind the bladder, were distended with a similar white substance, and greatly enlarged. The substance was inorganized.

The internal iliac and hypogastric arteries were, on both sides, in several parts obliterated by a hæmatoid substance, which adhered strongly to their coats, so as to be inseparable without laceration.

On examining the commencement of the colon from the cæcum, a stricture with thickening was found in it, with a completely circular ulceration of the mucous membrane, which was of a malignant character. The left kidney contained a fungoid tubercle of a darker colour than the diseased matter in the testis.

The ureter was enlarged.

The right kidney was wasted to one-third its natural size, and its pelvis and ureter were excessively enlarged to the termination of the ureter in the bladder.

The lungs were tuberculated and ulcerated.

Although this case was in some parts decidedly malignant, yet there was a great mixture of scrofulous, with the fungoid disease.

It is scarcely necessary to observe, that the history of this case at once shows that the disease in the testes was the result of a constitution broken down by anxiety of mind, and that, even if only one testis had been affected, an operation would have been fruitless and absurd; for the disease in the testis was only a concomitant of worse abdominal complaints, and the removal of one complaint would have only relieved the patient of a part of his disease. In such constitutions, we have too much reason to expect that even should the patient survive the operation, that he will ultimately sink under the return of the disease.

It is always proper before proceeding to the operation for this disease minutely to examine the state of the spermatic cord, to learn if it be diseased above the abdominal ring; and if it can be felt to be so, castration ought not to be performed, for I have never known it to succeed under these circumstances.

If any of the glands in the groin be diseased, the operation should also be rejected, and under these circumstances, the trial of medicines must be resorted to, with the hope of discovering some specific remedy for the complaint; and by leeches, and evaporating lotions, attempts should be made to subdue the inordinate action of the diseased part.

The advantages of such precautions are well exemplified by the following case.

CASE II.

Cambridge, March 3, 1830.

My dear Sir,

The testicle I sent you in 1823 was taken from a Mr. E—— of this town, a baker, about 25 years of age, whom I sent to consult you upon the propriety of removing it. He had tried various remedies to reduce it, the principal of which was mercury; but these failing, I remember it was your opinion the operation should not be delayed. The operation took place in March, 1823, from which he recovered in about three weeks, so as to be able to resume his business. In the following November he began to complain of pain in the back, extending forwards to the abdomen, on that side from which the testicle had been removed. In a few days it had increased to such a degree as to be attended by vomiting and considerable fever. These symptoms yielded almost entirely to two copious bleedings from the arm, and some aperient medicine; but about a fortnight after, similar symptoms returning, I examined the abdomen with some care, and could just discover sufficient enlargement on that side, to justify the apprehensions I had entertained of a similar disease to that affecting the testicle, having extended itself to some part (probably the lymphatic glands) connected with the testicle. The tumour in the abdomen continued increasing until the following May, 1824, when upon your recommendation—(I wrote to you)—he took large doses of Tincture of Iodine for some weeks. He seemed to derive no benefit from this remedy, and soon had recourse to the regular use of opium. He died in the end of July following.

Upon opening the abdomen, large irregular masses of a soft pulpy structure presented themselves in every direction, though evidently springing from that side from which the testicle had been removed, and having attachments posterior to the peritonæum. The texture of the diseased growth was so loose, that a handful of it might be scooped up without using any force. There was nothing else remarkable in this case. In all its symptoms and appearances, both in the testis and the subsequent tumour, the case exactly resembled four others that have happened since I have been in practice. I remember opening the body of an out-patient in the Borough, when I was your dresser, from whom the testicle had been extirpated some months before by Mr.

Brookes: the appearances in this case were also similar to those detailed above.

These are the only particulars worth noticing that I can call to my recollection just now respecting that testicle; but if any further inquiry suggest itself to you belonging to this case, it will give me very great pleasure to hear from you again.

Believe me, dear Sir,
Your's truly,
[See Plate IV. fig. 3.—Part II.] JOHN OKES.

I must confess that the fungoid disease offers the least favourable prognosis of any complaint to which the human frame is liable, uncontrollable by medicine, and rarely successfully removed by operation.

In the scirrhous disease of the testis, or what I have already described as being so called, as its progress is slower, it gives more time for the trial of medicine, and does not demand an operation so early as the fungoid disease; and when performed, it is more successful in its issue. But this disease requires, after the operation, as well as in the fungoid complaint, the administration of alterative medicines for the purpose of changing the constitution.

When the spermatic cord is affected in this complaint, there is the same objection to the removing of the testis, as in the fungoid disease, both as regards the recurrence of the complaint in the abdomen, and the danger to life from the performance of the operation. As I was passing through the Wards of Guy's Hospital, I came to the bed-side of a man who, with a hardened and enlarged testis, had the spermatic cord greatly thickened and indurated as high up as to the abdominal ring. I remarked to the pupils that the operation of castration would be improper in that case. One of the young gentlemen, however, thought differently, took a lodging for the man in the country, near London, and removed the testis. Inflammation of the peritoneum succeeded, and the man died, which I trust gave the operator a lesson, that he not only never forgot, but that it proved of service to him through the remainder of his professional career.

CASTRATION.

The operation of removing the testes, is not attended either with difficulty or danger, but still, there are certain preliminary steps, which tend much to facilitate its performance.

The pubes, and the scrotum should be shaved, for if the hair be left on, it not only hinders the operator in making a clean incision, but also the application of the adhesive plaister which is afterwards required.

The patient should be placed upon a strong table of convenient height, covered with blankets, and a T bandage around his waist, ready to be adjusted after the completion of the operation.

As I have already described that there are certain diseases to which the testicle is liable, in which there is a difficulty in forming a just diagnosis, I strongly recommend, as a prelude to the operation of castration, that a small incision should be made into the tunica vaginalis, upon the fore-part of the testis, to satisfy the Surgeon's mind as to the disease not being hydrocele or hæmatocele; and when this point has been settled, the operation for removing the testis may be safely performed, by making an incision from the abdominal ring to the very lowest part of the scrotum; attention to this circumstance offers two advantages; first, that matter is prevented from accumulating in the scrotum, when the suppurative inflammation begins; and secondly, that the testis is much more easily removed in consequence of the space acquired by this free incision.

Secondly—The fascial sheath of the spermatic cord, or, as technically termed, the fascia spermatica externa, is next to be opened below the abdominal ring, and the cord is to be completely exposed, so as to enable the operator to pinch it up between his fingers, that he may pass a needle and ligature through it, between the blood-vessels and the vas deferens, by means of which an assistant is able to prevent the possibility of the retraction of the cord into the inguinal canal upon its being divided.

This precaution may be considered as a work of supererogation; but Mr. Cline told me he witnessed the following circumstance. A Surgeon, in removing the testis, cut through the cord, close to the abdominal ring; and when he had removed the testis, he found that there was a swelling formed in the inguinal canal, attended with hemorrhage through the external ring, which could not be suppressed from the inability to seize the divided end of the cord. After much delay, and considerable anxiety, the tendon of the external oblique muscle was obliged to be layed open, when the cord was discovered, bleeding freely above the ring; and the spermatic artery was tied.

Ever since I heard the above history, I have secured the cord in the manner I have mentioned, before I venture to divide it.

The next step in the operation is to cut through the cord, for by the prior division of the cord the sensation of the part below is infinitely diminished; and here let me strongly urge the impropriety of dissecting out the testis before this be done; for it not only lengthens the time of the operation, but adds much to the patient's sufferings.

Having divided the cord, its lower portion is to be taken hold of by the Surgeon, and by it, the testis is to be drawn from the scrotum, cutting through its adhesions as it is drawn out. This step of the operation is generally easily executed; and if there be abnormial adhesions to the scrotum, they are more readily divided in this manner than in any other mode.

The arteries of the cord are next to be secured, taking care to put a ligature around the artery of the vas deferens, as well as the spermatic artery, for unless this precaution be taken, secondary hemorrhage is sure to occur, soon after the patient is placed in bed. The vessel accompanying the vas deferens is easily exposed by turning the cord upwards towards the abdomen.

I cannot too strongly deprecate the barbarous practice of the Surgeons of former times, of tying the whole of the cord to secure its vessels. It was their habit to draw the ligature with their whole force, the cries of the patient were horrible, and the operation dangerous. Mr. Chandler, in compliance with this custom, on the 22nd of October, 1807, removed the testis of a man in St. Thomas's Hospital, tying the spermatic cord in a single ligature, the man at the time complained dreadfully.

On the 30th of October the ligature separated, on the following day tetanus began, and on the 2nd of November he died. It is only wonderful to me that tetanus did not much more frequently result from this mode of procedure.

Besides securing the vessels of the spermatic cord, the external pudic artery usually requires a ligature, being necessarily divided in making the incision through the skin near to the external ring; should it bleed freely at the moment of division, an assistant should stay the bleeding by pressure until the operation is completed, and then the vessel may be tied.

Every bleeding vessel in the scrotum should be carefully secured, and particularly the artery of the septum, or considerable hemorrhage is sure to occur when the patient is placed in bed.

If the diseased testicle had been very large, so as to have produced very considerable extension of the skin, an elliptical portion of the scrotum should be removed, which prevents the liability to the formation of a recevoir of blood and pus. Some Surgeons deny the propriety of removing any skin unless it be adherent to the testicle, or involved in the disease; but of its efficacy when much elongated I can speak with confidence from experience.

The patient is to be then carried to bed in an horizontal posture, without any dressings being applied to the wound beyond a piece of dry lint; and when all apprehension of bleeding has ceased, then, and not till then, should the edges of the wound be brought together by two sutures, assisted by two or three strips of adhesive plaister, and the whole secured by the T bandage.

The patient should be kept extremely cool, being covered only by a sheet, to prevent relaxation of the scrotum; and in summer, constant irrigation should be maintained.

In eight days the sutures should be removed, and the wound generally heals in about three weeks.

I once removed a diseased testis, in which a hernia accompanied it; I first returned the hernia, and then dissected the cord from behind the sac. This patient, who had a chronic complaint in the testis, did perfectly well.

At Guy's Hospital I removed a diseased testicle from a patient who was also the subject of an irreducible omental hernia; in that case I divided the spermatic cord behind the hernial sac, secured the vessels, and the patient recovered without a bad symptom.

The operation of castration is generally performed in the manner I have described, by dividing the spermatic cord, and dissecting the testicle from the scrotum. But some Surgeons recommend a much more rapid mode of proceeding, and which I believe may be safely done when the diseased testicle has not acquired a very considerable size.

An incision is made down upon this cord, just as it emerges from the external ring, but only large enough to pass the ligature between its blood-vessels and the vas deferens, to secure the cord from retracting into the inguinal canal. An assistant then takes hold of the healthy testicle, including between his fingers, not only that half of the scrotum but also the septum, while the operator with his left hand draws the diseased testicle in the opposite direction, so as to separate it as widely as he can from the other, and then with a cataline or small amputating knife, with one stroke he removes the testicle and its scrotal covering together. It is urged by those who recommend this operation that the advantage derived is not merely from the rapidity with which it is performed, but also from the removal of the scrotum no superabundant skin is left to induce suppuration, and retard the healing process.

CHAPTER XIII.

IT was my original intention to have divided this Work into two parts, the first consisting of a description of the diseases of the testicle and epididymis; and in the second I intended to have considered the complaints to which the membranes and vessels of the testicle were subjected; but as the affections of the membranes will occupy but few pages, I ultimately considered it better to give the whole of the diseases in one view.

ON HYDROCELE.

The tunica vaginalis testis is a serous membrane, and consequently, like all the other serous structures, is liable to dropsical effusion. When opened in its natural and living state, a halitus only arises from it, and then the surface soon becomes dry; but if, from any cause there is a greater determination of blood to the part than usual, the secretion becomes fluid, which often accumulates in a very considerable quantity, producing the disease which is called hydrocele.

Hydrocele is an accumulation of fluid between the tunica vaginalis testis, and tunica vaginalis reflexa, producing a pyriform, fluctuating, and generally, a transparent swelling in the scrotum.

The term hydrocele, in fact, applies to any watery tumour; but it is now limited by Surgeons to hydrocele of the tunica vaginalis testis, and of the spermatic cord.

The following are the characteristic symptoms of the disease.

The swelling begins at the lower part of the testis, is unattended with pain, and is usually at first discovered by mere accident; when compressed, the fingers readily sink through the swelling, so that the testis can be distinctly perceived, but as the tumour increases, it becomes tense, and then the testicle can no longer be felt. It next assumes a pyriform shape; the largest part of the swelling being below, and as it rises towards the abdominal ring, its diameter gradually lessens. Even at this period it is still unattended with pain, unless the swelling acquires great magnitude; and then, from its weight and tension, it produces an uneasy sensation in the lower part of the back. Some few of the vessels of the scrotum are sometimes enlarged; but the skin does not appear to be inflamed, and the patient suffers no other inconvenience than from the weight, and magnitude of the swelling, the general health being unaffected.

When the swelling is attentively examined, it is generally found to be transparent; but I have been frequently surprised to hear a Surgeon deny the transparency of a hydrocele; but this is often in consequence of their not understanding the proper mode of detecting this physical sign. The room is to be darkened from the light of day: the patient or an assistant should then hold a candle burning brightly close to the side of the scrotum, while the Surgeon grasping the posterior part of the swelling, renders its fore-part as tense as possible; and then looking at the swelling from the opposite side to the candle, and placing one hand on the fore-part of the scrotum, the transparency is generally obvious. The strong light of the sun falling directly upon the part, will often answer equally well in showing its transparency, if the scrotum be rendered tense, and the skin proportionably attenuated.

Fluctuation is usually a distinct diagnostic mark of hydrocele, and may be detected in any part of the swelling by pressing with one finger while another is placed at some remote distance from it, when an obvious influence may be communicated from one to the other; this, however, is not invariably the case, for when the tunic is excessively distended, the incompressibility of the fluid prevents this sensation, and the whole tumour feels hard, and as if solid.

The testis is generally placed in the upper part of the lower third of the swelling, and at the posterior part of the scrotum; pressure at that part gives the sensation of squeezing the testis, and when the swelling is transparent, the testis may be seen in that situation.

Hydrocele is mostly a moveable swelling; for when it does not distend the part much, in the course of the spermatic cord, it bends easily upon the abdomen, and moves readily in every direction.

Such is the usual character of the disease; but sometimes, and not unfrequently, it is the result of inflammation of the testis, when it is accompanied with pain, redness, hardness, and swelling of the part, which assumes more the form of the testis itself, and is less distinctly transparent.

The fluid which hydrocele usually contains, resembles serum, being yellow and transparent like it, coagulable by heat, by acids, and by alcohol; and the solutions of sulphate of zinc, or port wine and water, when employed as injections for the cure of this disease, have also the effect of coagulating the fluid which may, perhaps, explain its modus operandi.

VARIETIES OF HYDROCELE.

As this disease is subject to great varieties, it is necessary that each deviation from the usual condition should be particularly pointed out.

The complaint sometimes exists on both sides of the scrotum; and when a patient so affected seeks the radical cure by injection, the Surgeon should only operate upon one side at a time, as the injection of both tunics might lead to too great a degree of inflammation.

The testis varies in its situation in this disease; it is sometimes adherent to the fore-part of the tunica vaginalis, and the serum is accumulated on each side of it. I was called to the following case.

A gentleman consulted a Surgeon for a swelling in his scrotum, who pronounced it to be hydrocele. He passed a trocar into it; but as no water followed, he said, "I am mistaken; this is a solid enlargement of the testis, and it must be removed." The patient, excessively alarmed at so severe a sentence, said he should require time to think of it, and consulted another Surgeon, who, upon examining the patient, discovered venereal spots upon the skin of the abdomen, and a node upon the tibia. Mercury was prescribed, and the patient got well of those symptoms, as well as of the enlargement and hardness of the testis. But the swelling remained in the scrotum, which was now obviously a hydrocele, from its fluctuation and its transparency, but with the testis adhering to the anterior part of the tunica vaginalis. It was injected from the side, instead of the fore-part, and the disease was perfectly cured.

Inflammation of the testicle is often followed by a partial adhesion of the tunica vaginalis; and when this adhesion is accompanied with effusion of water, the hydrocele may be variously situated with respect to the testicle, either above it, at its lower part, or on either side, and sometimes, though but rarely, it is placed posteriorly. When the water is collected at the back of the testicle, it arises from the tunica vaginalis yielding to its pressure; and thus forming a pouch with rather a narrow orifice of communication from the tunica vaginalis, while the fundus of the tumour is thrust behind the testicle. Sometimes water is accumulated in the tunica vaginalis in several cysts, having no communication with each other, each of which would require opening to evacuate their fluid. A cyst is sometimes formed from the extremity of the epididymis, and hangs within the tunica vaginalis; generally, but not always, it is accompanied by common hydrocele: but the cyst may be entirely adventitious when its fluid is found not to be so albuminous as when formed within the tunica vaginalis.

Hydrocele sometimes forms two swellings, having an hourglass contraction between them: one is placed opposite the testicle; the other reaches to the abdominal ring, having a smaller swelling of communication. This swelling, which reaches to the abdominal muscles, dilates upon coughing, and bears some resemblance to a hernia, from which it is to be distinguished by its permanence, its transparency, its fluctuation, by the history of its commencement, and by the absence of intestinal interruption.

Two distinct hydroceles are sometimes formed upon the same side, of which the following is an example.

CASE.

Mr. Roberts, Surgeon, of Malmesbury, in Wiltshire, consulted Dr. Cheston, of Gloucester, respecting a patient of his who had hydrocele; and it was agreed that the water should be drawn off, which Mr. Roberts did in Dr. Cheston's presence: but they were both surprised to see a swelling remaining, half as large as that which existed before the operation, and which could not be emptied through the canula, it was therefore withdrawn, and soon after, he was sent to London, to be placed under my care. I tapped the lower hydrocele, which had again formed, and a yellow serous fluid was discharged; but still half the swelling remained. I then darkened the room, ordered a candle, and examined the swelling, which extended from the upper part of the testis to the abdominal ring. It was very transparent: I therefore tapped it, and drew off a fluid like water, quite free from colour, which contained some coagulable matter, but less than common serum. I afterwards injected the lower hydrocele, and repeatedly tapped the upper swelling. This additional enlargement must either have arisen from a cyst formed in the spermatic cord, or have been the result of some previously existing hernia, the orifice of which had been closed towards the abdomen, and secretion from the sac continued: the former, however, I believe is the truth; for in an old hernial sac closed at the abdomen, although I have three or four times seen it in the dead body, I have never found any fluid; and, as far as I have had an opportunity of witnessing, the fluid of hydrocele of the spermatic cord is less serous, and more watery, than the fluid of hydrocele of the tunica vaginalis.

As the tunica vaginalis has originally a communication with the cavity of the abdomen, which does not always close at birth, but sometimes remains through life, water, formed in the tunica vaginalis, passes into the cavity of the abdomen; or, what more frequently happens, water forms in the cavity of the abdomen, and descends into the tunica vaginalis: in either case the hydrocele communicates with the abdominal cavity. I have several times seen this circumstance in children, and occasionally also in the adult.

The following is an interesting case of congenital hydrocele.

Mr. Dobson, of Harlow, sent me a young gentleman with hydrocele, which communicated with the abdomen. I wrote to Mr. Dobson to the following effect:—"Our first step must be to apply a truss, and obliterate the communication of the tunica vaginalis with the abdomen; and then we will inject the hydrocele."—Many months afterwards Mr. Dobson wrote me word that the truss had cured the hydrocele; for that when the opening of the tunica vaginalis had become obliterated by its pressure, the water had entirely disappeared.

In this case, therefore, it was probable that the water formed in the abdomen, and descended into the tunica vaginalis: and as the child's health improved, and the tunica vaginalis became closed, the water which had been previously collected in the tunic, became absorbed, and the disposition to ascites ceased.

When hydrocele communicates with the abdomen in the adult, and there is at the same time abdominal dropsy, it is very convenient to tap the patient through the scrotum and tunica vaginalis.

The usual quantity of fluid in hydrocele is from six to eight ounces, but sometimes it accumulates to a much greater extent;

the largest hydrocele I ever heard of, was in Mr. Gibbon, the historian, from whom Mr. Cline drew off six quarts of fluid. My colleague, Mr. Morgan, also mentioned to me a case of very great accumulation of water in hydrocele.

The fluid of hydrocele also varies in its appearance; although generally yellow, transparent, and saltish to the taste, it sometimes contains a quantity of white flaky matter, produced by chronic inflammation; this appearance I have seen most frequently in hydrocele from the West Indians, although I have witnessed it in the hydrocele of English patients. This flaky deposit is produced by broken adhesive matter, which subsides from a fluid more watery than serum drawn from common hydrocele. It arises from a chronic inflammation existing during the formation of the fluid.

When hydrocele is the result of acute inflammation of the testis, the fluid is frequently of a reddish colour, from an admixture of red particles of the blood; and the same appearance is observed, when hydrocele has immediately succeeded a blow upon the scrotum.

I have also seen in the fluid of hydrocele, loose cartilaginous and osseous bodies. They are, I believe the result of a peculiar inflammation of the tunica vaginalis; they grow by stalks from the surface of that membrane covering the testicle, and from the extremity of the epididymis; and by becoming accidentally detached, are found loose within the tunica vaginalis.

When hydrocele has existed for a great length of time, the tunica vaginalis becomes thickened, like parchment, and consequently opaque.

Mr. Warner, Surgeon of Guy's Hospital, found a tunica vaginalis ossified. There is also one in that state in the collection at Guy's Hospital; and Mr. Beavers, a pupil of Mr. Heys, of Leeds, gave me a specimen of one which he removed from a dead body. This earthy deposition is the result of chronic inflammation, and is generally accompanied, by some adhesions of the tunica vaginalis.

The following is an analysis of ossific matter from the tunica vaginalis made for me by Mr. John T. Barry of Plough Court.

Analysis.

Divested of membrane, and dried, 100 parts consist of

Phosphate of Lime	45
Carbonate of Lime (with a trace of Magnesia)	17
Animal Matter	38
	100

6th, 3rd Mo. 1830.

DIAGNOSIS OF HYDROCELE.

The strong marks of distinction between hydrocele and other diseases, consist, first, in its transparency, which, in a large proportion of cases, is a sure diagnostic.

Secondly, in its distinct, and extended fluctuation.

Thirdly, in its commencement at the lower part of the tunica vaginalis, and gradually extending upwards.

The diseased testicle is distinguishable from hydrocele by its much greater weight, and from the form of the swelling, which is much more flattened on its sides than in hydrocele; and the epididymis may generally be felt as a distinct swelling, while in hydrocele it is concealed, and forms a part of the general enlargement.

The spermatic cord, in affections of the testicle, may generally be felt in its whole course from the diseased organ to the abdomen, while in hydrocele it is involved in the tumour. The vascularity of the scrotum, pain felt in the loins, and more or less constitutional disturbance will also lead the Surgeon to the suspicion of disease of the testicle, even in such cases where it may be complicated with hydrocele. So strongly am I impressed with this fact, that when a patient on entering my room says, “Sir, I have a disease in my testicle,” I look at his countenance, and if I observe a healthy aspect I am wont to say, "I doubt that, Sir," and upon examination I usually find the disease to be only hydrocele.

Hydrocele may usually be distinguished from hernia by the occasional return of the hernial contents into the abdomen; by the dilatation of hernia in coughing; by hernia descending from the abdomen; while the tumour of hydrocele increases from below upwards. But hydrocele and hernia are sometimes combined in the same individual, and the fluid being placed in front of the hernial protrusion the true nature of the case is rendered very difficult to be ascertained; and a just knowledge of the state of the patient is only to be acquired by a strict investigation into the history of the case, as well as a minute examination of the physical condition of the tumour. The difficulty is rendered still greater when congenital hernia co-exists with fluid in the tunica vaginalis.

Hydrocele may be distinguished from varicocele by placing the patient in the recumbent posture, and by raising the scrotum, when, if it be the latter affection, the tumour will disappear, and then, by making firm pressure on the abdominal ring, will again rapidly present itself from the refilling of the enlarged veins. This latter circumstance will distinguish varicocele from the congenital hydrocele.

From hæmatocele it is difficult to distinguish it; but I will state the difference in the two diseases when speaking more particularly of the former affection :—here it will be only necessary to say, that hæmatocele generally appears suddenly after a blow, and that it is more solid than hydrocele ; but in all cases of doubt, the tunica vaginalis may, and ought to be punctured with a lancet.

OF THE CAUSES OF HYDROCELE.

Ascites, as well as this disease in particular, is often said to arise from increased secretion or diminished absorption, by which the question of its cause is really avoided. For myself, I believe a diminished absorption is very rarely the cause of true dropsy.

We do sometimes observe a leg or an arm swollen, from enlargement of the absorbent glands of the groin or axilla ; but the swelling is very different from common œdema, being much more solid and tense than that of dropsy usually is. But dropsical swellings generally are the result of an increased secretion from the arteries. The proofs of this are found in the greater vascularity of the membranous surface while producing it in the living, or when injected after death ; also in the thickening, and other changes in the membranes, produced in long-continued dropsies and hydroceles; as well as in the quickness with which hydrocele succeeds inflammation of the testis and tunica vaginalis.

Common hydrocele is, however, rather the result of relaxation in the capellaries of tunica vaginalis, under which circumstance their altered action leads to the exudation of a larger quantity of fluid than natural, rather than the effect of mere inflammation to which it is usually attributed. The absorbent vessels of the spermatic cord are very much larger on the side in which the hydrocele exists, than on the opposite or undiseased side, as I have seen by injection.

Hydrocele is not unfrequently the effect of inflammation of the testicle, which, as it subsides, leaves the tunica vaginalis filled with a serum of a deeper colour than usual: it is often slightly tinged with red particles, and readily afterwards becomes absorbed.

But hydrocele is generally merely a local disease, although sometimes connected with a constitutional hydropic disposition.

OF THE NATURAL CURE OF HYDROCELE.

If a hydrocele be suffered to remain, and become of large size, and if the patient be under the necessity of labouring to obtain his subsistence, inflammation of the tunica vaginalis, and scrotum may arise, from excessive distention.

A slough of the scrotum and tunica vaginalis is sometimes produced, and as it separates, the water escapes, a suppurative inflammation succeeds, granulations arise, and the patient in this way becomes spontaneously cured.

I once, and only once, have had an opportunity of witnessing this process, in a patient of Mr. Lucas, of Guy's Hospital; and the symptoms were so excessively severe, that I believe they would have been destructive to life in an older or more unhealthy person.

Hydrocele is not always cured by a blow which tears the tunica vaginalis. I once attended a gentleman who consulted me for a hydrocele; and who, whilst riding in the neighbourhood of Gibraltar, was thrown upon the pommel of his saddle, and received a severe blow on the scrotum. The hydrocele in a few hours disappeared; but in six months again formed, and was, he thought, as large as before. I injected it about two years after the above accident, and succeeded in effecting a permanent cure.

OF THE CURE OF HYDROCELE BY ABSORPTION.

This disease is in young people very generally curable by absorption. If a child be brought to me with hydrocele, I direct a dose of Calomel and Rhubarb occasionally, and order a suspensory bandage, which is to be kept wet with the Hydrochlorate of Ammonia and Liquor Ammoniæ Acetatis, in the proportion ʒij. of the former to vj. of the latter.

This, after a short time, produces excoriation, and causes the absorption of the fluid. The Tinctura Lyttæ may be added, if the fluid be not soon absorbed; or the Tincture of Iodine may be applied.

When hydrocele is the result of inflammation of the testis in the adult, the same mode of treatment will often effect the absorption of the fluid, *viz.* giving Submurias Hydrargyri cum Extract. Colocynth. Comp., and applying an irritating lotion to the part.

These applications have, however, little power over the common hydrocele of the adult; and I have tried continued blistering in them without producing a cure.

PALLIATIVE TREATMENT, OR TAPPING FOR HYDROCELE.

When the absence of health forbids the operation for injection, which, although mild, is attended in some constitutions with risk; if a patient's fears prevent him from submitting to a more effectual treatment, or it be inconvenient to him to undergo any other operation, the water is to be removed by tapping.

The instruments required are a trocar and canula. The canula is to be two inches long, and the eighth of an inch in diameter.

Sometimes a lancet only is employed to open the tunica vaginalis; but it is an inconvenient instrument, leading to difficulty in evacuating the whole of the water, and liable to cause bleeding into the tunica vaginalis after the operation; and, as will be hereafter seen, it tends to the production of hæmatocele.

Before the operation be performed, the swelling should be examined by the light of a candle, as well as a careful manipular examination, to ascertain the situation of the testicle and the spermatic cord; for when partial adhesions have been produced between the different surfaces of the tunica vaginalis, the ordinary rule for the introduction of the trocar is to be varied, and the point of the instrument to be inserted at the most distinct point of fluctuation, whether it be on the fore-part, or sides of the swelling.

The mode of performing this operation is as follows:—

The person is to stand before the Surgeon, who grasps the scrotum and swelling firmly with his left hand, and then introduces the trocar at a point two-thirds downwards of the length of the swelling, not directly horizontally, but with a slight obliquity upwards.

When the canula has entered the tunica vaginalis, the trocar is withdrawn; the canula is then passed further into the tunica vaginalis, and the water escapes.

The swelling is grasped, that the fore-part of the scrotum and the tunica vaginalis may be put upon the stretch, that the trocar may enter easily.

The trocar is to be directed slightly upwards, because then the testicle is not in danger of receiving injury, which will be the case if the trocar be entered horizontally; and the canula is further introduced when the trocar is withdrawn, in order that a wound of the spermatic cord or testicle may be effectually prevented.

When the water has been removed, and the canula is withdrawn, a small piece of adhesive plaister should be laid over the wound, and a suspensory bandage be applied.

This operation sometimes succeeds in preventing a return of the disease, although very rarely; but to give the patient the best prospect of it, a strong stimulating lotion may be immediately applied.

Exercise, taken immediately after the operation of tapping, sometimes produces an adhesive inflammation, and prevents a return of the disease. I have known a person who had been tapped in the morning, travel at night by a coach to Manchester, and have sufficient inflammation produced, to effect a cure.

A long walk will sometimes produce the same effect; but in old and unhealthy individuals this is attended with risk.

As in very few cases inflammation succeeds, or a cure is produced by this operation, the patient returns in a few months for its repetition; but the time of reaccumulation is very uncertain.

If the disease very soon reappear, it is a proof of an hydropic disposition; and it is right to give the Chloride of Mercury with Squills at night, and a draught composed of the Tincture of Digitalis, Spiritus Ætheris Nitrici, and Mistura Camphoræ, twice in the day.

This apparently trifling operation is not entirely unattended with danger, as the following case proves:—

Mr. Somersett, an aged gentleman, came to town from Wiltshire to undergo the operation; and on the evening of the day on which it was performed, he took a long walk.

On the following day but one, there was a considerable inflammation in the scrotum; and his son, who was my dresser at the Hospital, advised him to rest, and suspend the part: the inflammation, however, proceeded, and in a week from the operation he expired. Gangrene had been produced in the scrotum to a considerable extent:—Well may it be said in our Profession—"There are some you must not touch; there are others you cannot kill."

Mr. Green, of Lewisham, has published a case of a similar kind, which I had an opportunity of witnessing. The patient, an elderly and rather an unhealthy man, took a long walk soon after the operation; and when he returned, his scrotum was swollen and painful, and on the next day was highly inflamed. In three or four days I was sent for, and I found the whole scrotum gangrenous, swelled, extremely tense, and emphysematous; the pulse excessively quick, and the man evidently dying.—Indeed the young Surgeon cannot have it too strongly impressed upon his mind, that operations, however trifling, will be occasionally destructive; and the result depends so much upon the patient's constitution, that their prognosis should be always guarded; and they must never neglect a strict attention to the slightest circumstance which can have a tendency to prevent risk, and to add to the security of the patient; as well as to remember, that operations for local diseases ought not to be performed until the constitution be well prepared to support them; for death but rarely occurs from an operation performed on a healthy person, whatever may be the local difficulties.

OF THE OPERATIONS FOR THE CURE OF HYDROCELE.

Various have been the operations advised and resorted to for the cure of this disease;—some very severe—others very uncertain in their issue. The excision of part of the tunica vaginalis, to a greater or less extent, was the practice adopted by Surgeons forty or fifty years ago; an operation which I have seen two or three times performed, but which I hope never to witness again, being painful in its performance, and violent in its consequences, beyond what this disease, which is little more than an inconvenience, either warrants or requires.

Mr. Warner was the last Surgeon whom I saw perform this operation, the result of which was sloughing of the scrotum as well as of the testis.

Another operation recommended for the radical cure of hydrocele consisted in passing a tent into an opening made in the tunica vaginalis, to produce inflammation; but as the effect of this frequently induced only a partial adhesion, it often did not prevent a return of the disease.

The application of caustic has also been employed. Potassa fusa is applied to the scrotum, and rubbed upon the part until its influence reaches the tunica vaginalis, destroying its vitality and texture; the consequent inflammation tends to remove the extraneous body; the eschar separates at its edge, and the cavity of the tunica vaginalis is in part obliterated by adhesion, and in part filled by granulations. This mode of procedure, when well managed, proves a very successful operation: but it requires great attention in its use, is occasionally severe, and I have known it, in a diseased constitution, destroy life. There is a preparation in the collection of St. Thomas's Hospital, of a hydrocele taken from a patient of Mr. Cline, who died under the operation of caustic for this disease.

It may be distinguished from the other preparations by a flake of adhesive matter, which is adhering at the upper part of the cavity; whilst the bag below contained serum, pus, and flakes of adhesive matter floating in them, but which contents were discharged when the tunic was laid open.

The operations to which I have recourse in the radical cure of hydrocele are three:—either injection, seton, or incision. The object of the two former, is to excite adhesive inflammation, or to change the action of the part, so as to prevent further secretion; and of the latter, to fill up the cavity with granulations.

For the operation by injection we are indebted to Sir James Earle: and those who are old enough to remember the contrariety of opinion on the treatment of hydrocele at that day, Mr. Pott advocating seton, Mr. Else caustic, and Mr. Hunter incision, well know how to appreciate the proposal of Sir James Earle, and must be aware how much our Profession, and mankind, are indebted to him for his suggestion.

The apparatus which is required for this operation, is an elastic gum bottle, capable of containing about six ounces of fluid, fitted with a brass cylinder to receive a stop-cock, which can be attached at pleasure: a trocar, and a canula, two inches long, are also necessary.

The fluid which is most frequently used as an injection, is equal parts of Port Wine and Water; or sometimes, when the operation has failed upon a former occasion, two-thirds of Wine and one-third of Water may be employed; but Port Wine varies so much in strength, being sometimes but little else than a coloured Solution of Brandy, and at others, deprived of a considerable quantity of its alcohol, it must ever be a very uncertain injection. One dram of the Sulphate of Zinc to one pint of Water may be therefore substituted, and makes an excellent injection. One-sixth of Spirits of Wine to five-sixths of Water has been also employed. Even cold water often succeeds very well, but I have frequently known it fail. The serum drawn from the hydrocele has been by some Surgeons injected, and has been stated to have succeeded, but for my own part, I should consider it a very unlikely fluid to produce the desired effect. Milk I once threw into the tunica vaginalis, and it returned curdled; but some of the larger portions remained in the tunica vaginalis, which led to too violent an inflammation, and produced suppuration.

But whatever fluid may be employed, the operation of injection is to be performed in the following manner:—

The patient is to be placed in a recumbent posture upon a sofa or chairs, and the Surgeon to sit by his side. The tumour should be grasped in the Surgeon's left hand, so as to render the scrotum tense, and the trocar is to be thrust in gradually and obliquely upwards: it should enter one-third from the lower part of the swelling, and be directed, not immediately backwards towards the testicle, but a little obliquely upwards. The trocar and canula having entered the tunica vaginalis, the trocar is to be withdrawn; and in doing this, the Surgeon should not only pinch up the scrotum, but the tunica vaginalis around the canula, to confine it securely within the bag; and when the trocar is withdrawn, the canula should be pushed up to its hilt within the tunic, and the water then escapes into a basin provided for the purpose. The Surgeon, then fitting the stop-cock on the elastic bottle, introduces the stop-cock into the canula, and opening the valve the contents of the bottle are then thrown into the tunica vaginalis, great care being taken during this step of the operation to press the tunic upon the canula. The patient first feels pain in his groin, next near the spinous process of the ilium, and then in the loins; sometimes he complains of uneasiness at the neck of the bladder. The fluid is to be withdrawn at the end of five minutes, and the operation is thus completed.

Although, as a general rule, five minutes are occupied in the retention of the injection, yet it may be observed, that the suffering of the patient is sometimes so considerable, that the Surgeon may be tempted to remove the fluid in a shorter period; but it is worthy of remark that the succeeding inflammation is not always commensurate with the degree of irritation endured. For those who suffer the most at the time of injecting, have often the least inflammation; and I am therefore disposed to continue it five minutes in all adults, unless the pain be intolerable.

In young persons three minutes will suffice.

With respect to the quantity of fluid introduced, I never distend the tunica vaginalis with the injection, but throw in less fluid than has been removed from the hydrocele; and move it in the tunica vaginalis, so as to make it apply itself to every part of the surface. If much be injected, the cremaster muscle is liable to contract, and force a part of the fluid by the side of the canula, into the cellular membrane of the scrotum, and sometimes produce inflammation and sloughing of that structure.

If, when I have drawn off the water, I find the testis somewhat enlarged, it does not prevent my proceeding with the operation; for I have learned by experience that the excitement which the injection produces, often diminishes the swelling of the testicle, and does not prevent the success of the operation. But it is necessary, in these chronic enlargements of the testicle, to ascertain the state of the urethra, and to treat the disease as I have previously recommended, namely, by the recumbent posture, and by the employment of bougies if the stricture be not irritable.

When the operation is concluded, much depends upon the after-treatment, in rendering its issue successful. The suspensory bandage is to be forbidden, and the rules laid down for the patient to follow are these : " If you be in much pain, lie down ; if you suffer but little, take exercise ; if you be in much pain, eat sparingly, and drink only diluents ; if you suffer but little, take your dinner, and two or three glasses of wine. Come to me to-morrow."—If on the morrow there be redness in the scrotum, considerable tenderness, and some swelling, the suspensory bandage is to be worn, the exercise to be moderated, and the diet is to be light ; but if there be little appearance of inflammation, it is right to grasp the scrotum in one hand, and gently tap it a few times with the other, to produce slight pain. Exercise, and a generous diet, are to be recommended until redness of the scrotum, swelling, and pain in the part be produced, for the inflammatory swelling from the injection should be nearly as great as the enlargement which had been previously produced by the disease.

The swelling usually continues increasing for a week, is then stationary for a few days, and then declines, so that in three weeks it has subsided. The operation rarely requires a confinement of more than a few hours ;—sometimes it does so for a week, but in general patients, after four days, are enabled to follow their occupations.

This operation sometimes fails in producing sufficient inflammation to effect a cure. I once asked Sir James Earle if he did not sometimes fail, and he said, " scarcely ever." This is quite contrary to my experience; for I sometimes fail, and should very often do so, but for great care in the after-treatment, upon which I think much depends. I sometimes, when water is reproduced a few days after the operation, which is not of unfrequent occurrence, tap it, to remove the serum, and to produce by this second operation a greater degree of inflammation.

I have seen suppuration follow the operation of injection, in very irritable persons, and in cases in which hydrocele has been the result of inflammation, and which inflammation of the tunica vaginalis had not completely subsided when the injection was employed: it has occasioned delay, made the operation much more painful, and rendered confinement necessary; but it has rendered the cure more certain.

A young man, about twenty years of age, came to me in Spring Gardens, with a hydrocele on each side. He resided in Long Lane, in the Borough, a distance of two miles from my house. I injected one of the swellings with equal parts of Port Wine and Water, and sent him home. I was sent for to him on account of a high degree of inflammation, which proceeded to suppuration, and which I imputed to my suffering him to go to a distance directly after the operation. When he had recovered, I injected the other hydrocele at his own house, and directed him to keep his bed, and used the same strength of injection as before; yet this hydrocele also suppurated. It may therefore be inferred that the suppuration was the result of the state of constitution, and not the effect of the exertion after the operation.

I was once consulted, a few miles in the country, with Mr. Norris, respecting a gentleman with a hydrocele, which had been injected in London; and he was suffered to return home after the operation, and the tunica vaginalis immediately suppurated.

When serous cysts grow between the tunica vaginalis and tunica albuginea, the operation of injection will necessarily occasionally fail; or if the tunica vaginalis be previously divided into different cavities by adhesions, the influence of the operation will extend no farther than to the particular bag injected, and lead therefore to a failure in the cure.

The operation of injection is not entirely devoid of danger, even when judiciously performed; but danger also results from throwing the injection into the cellular membrane of the scrotum. I have seen many cases in which extensive sloughs were produced from this cause; and the following is a case well worthy of attention, in which the result was fatal.

A patient had been under my care in Guy's Hospital for hydrocele, which I injected, and failed in producing a cure. Two years afterwards he was admitted under the care of one of my colleagues. I spoke to the man, and examined him: the case was decidedly hydrocele, on the same side as before. About a fortnight after, as I passed through the same Ward, I said to one of the pupils by my side—" Mr. Godfrey, where is the man with hydrocele?"—" Sir," said he, " he has quitted the Hospital." " Indeed!" I said, " Why?"—No answer was given. As I was returning over London Bridge, in my way to the City, Mr. Godfrey joined me, and said—" Sir, I beg your pardon for telling you the man had quitted the Hospital; but the fact is, that he is dead. The dresser of the Surgeon under whose care he was, attempted to inject the hydrocele, by the permission of the Surgeon. He threw in the fluid with great difficulty, and only after repeated efforts. The man complained violently; and when the injection was attempted to be withdrawn, it would not escape: in short, it had entered the cellular membrane only; violent inflammation and gangrene ensued, and the man died in a week."—This circumstance happened from the canula not having passed into the tunica vaginalis, so that the injection never entered it; and even if the canula had entered the tunic, and it be not confined there by pinching the tunica vaginalis around it, it is apt to permit the injection to pass by its side into the cellular tissue, and to produce sloughs. This was the reason that I mentioned the great care which was necessary to push the canula home, and to pinch the tunica vaginalis around it.

I have seen many cases of sloughing of the cellular membrane from this cause, and request Surgeons to be upon their guard respecting it. The violent pain which is produced by the escape of the injection into the cellular membrane, proves that *Haller* and others have been wrong, in supposing this tissue is an insensible part of the body.

The mode in which the cure is generally effected, is by the effusion of serum and fibrine into the tunica vaginalis. The serum becomes absorbed, and the fibrine glues the sides of the tunic together, although a great portion of it is ultimately absorbed; but this effusion is not necessary to the cure, for in many cases it seems to be effected by a change of action in the capillary vessels of the tunic.

Mr. Headington informed me that he had dissected a hydrocele which had been injected, and the tunic had adhered. It is generally supposed that the failure in the operation is in consequence of this adhesion not taking place. I am induced, however, to believe that the cure of hydrocele from injection much more frequently depends upon the altered action of the vessels, than upon the adhesion of the two surfaces of the tunica vaginalis.

A Captain in the coasting trade came to me with hydrocele, which I injected, and cured him. Some years afterwards I attended him, with Mr. Holt, a Surgeon in the Kent Road, for a disease of which he died. I requested Mr. Holt to take away the testicle and tunica vaginalis after death, which he did, and it is now in the collection of St. Thomas's Hospital. The tunic had adhered very partially; it was more relaxed than usual, but did not contain water; so that, from the change of action, or effusion on the mouths of the vessels, it had ceased to be a secreting surface.

Upon the whole, the operation by injection is to be ranked amongst the most useful of the modern improvements of practical Surgery, when we consider the frequency of the disease, and the mildness and safety of the operation. It does not vie with Hunter's operation for Aneurism: it does not rank in excellence with Civiale's operation for the Stone; but it places Sir James Earle amongst the useful contributors to the improvements of modern Surgery.

OF THE OPERATION BY INCISION.

When obscurity hangs over the nature of the case, as to its being connected with hernia, or some enlargement or disease in the testicle, is complicated with hydrocele, it becomes necessary to open the tunica vaginalis for the purpose of exploring the nature of the malady.

The simple incision for hydrocele was one of the earliest operations for this complaint; but it was supposed to fail frequently, in consequence of the two surfaces of the tunica vaginalis not coalescing. Mr. Hunter, to prevent partial adhesions, introduced some extraneous body within the cavity of the tunica vaginalis, and thus forced the part into inflammation, suppuration, and granulation, which was the further object in the introduction of an extraneous substance. The operation was then performed, by beginning an incision at the upper part of the swelling, and extending it only two-thirds downwards ; for if it be made to the lower part of the tunica vaginalis, it leaves the testis too much exposed, and is liable to produce excessive inflammation in it. The water being evacuated, and the state of the testis ascertained, as well as if there be any other disease connected with the hydrocele, and the negative being proved, a little flour was sprinkled on the tunic, which induced the granulating process, by which any return of the disease is almost certainly precluded. Very seldom, however, is such an operation required, and ought not to be had recourse to but in cases of great doubt with respect to the state of the testis, as it is one of great severity, and in old people, or in broken-down constitutions, will sometimes lead to the destruction of life.

There is a preparation in the collection of St. Thomas's Hospital, of a granulating tunica vaginalis, and a little lint adhering to its surface. It was taken from a patient of Mr. Chandler's, who, instead of using flour, after opening the tunica vaginalis, and discharging the water, introduced lint into the cavity, a practice, which at that time, was not uncommon. Violent constitutional derangement ensued, and the patient sank under the irritation, and discharge. After the operation of incision a poultice only should be applied; and the cure is effected by suppuration, and granulation.

A partial excision of the tunica vaginalis was recommended by Mr. Tyre, of Gloucester, and I believe tried by many other Surgeons; the operation consisted in drawing off the water by making a small incision, and then removing a portion of the serous bag; it has, however, proved an uncertain mode of producing the desired effect, sometimes inducing too violent a degree of inflammation, while at others little or no action has resulted, so that this mode of proceeding has fallen into disuse.

OF THE SETON, FOR THE CURE OF HYDROCELE.

In cases in which hydrocele in children will not yield to stimulating lotions, used with a view to produce absorption, I prefer the following plan, to the operation of injection.

I pass a Surgeon's common curved needle and thread through the hydrocele transversely, about half-way from the upper to the lower part of the swelling, including about an inch and a half of integument, and one inch of the tunica vaginalis. I then tie the thread in a knot, leaving it loosely hanging in the tunica vaginalis and scrotum. No confinement is necessary. The child runs about as usual, until the part reddens, swells, and becomes hard, which is in about a week; and at the end of that time I withdraw the thread, and the adhesive inflammation produces the cure.

I sometimes adopt the same plan in the adult, when the injection has not produced sufficient inflammation, and it prevents the necessity of any repetition of that operation, if it be done before the inflammation produced by the injection has entirely disappeared.

This plan is, however, sometimes followed by violent inflammation and suppuration that the effects of the seton should be carefully watched, so that it may be removed immediately a sufficient action has been set up.

As I was anxious to know whether there was any peculiarity in the nature of the disease, or in the mode of treatment of hydrocele in the West Indies, where it is of such frequent occurrence, I wrote to my friend Mr. Caddell for his experience on the subject, and received the following reply.

My dear Sir Astley,

I thank you for your letter. It is so long since I have bestowed a thought on professional subjects (nearly ten years), that I feel quite rusty, I fear too rusty, to venture on any thing which is to appear in print, without some apprehension.

Hydrocele is a very frequent disease in Barbadoes, but not the every day disease, that perhaps you may have been led to believe. I think the cellular membrane of the scrotum is generally more thickened, than in hydrocele in this country. I think the epididymis and cord are much more apt to be varicose, or thickened. Persons in general suffer their hydroceles to grow larger, before seeking relief from them. Injection is as successful in Barbadoes as in England. It was a matter of indifference to me, whether I used Solution of White Vitriol, or diluted Port Wine. I have injected hydroceles of three pints successfully; but beyond that size, and even for that size, I preferred Caustic, to injection.

Wherever the fluid varied very much from the ordinary fluid of hydrocele either on the first drawing off, when collected again, or where the tunica vaginalis has been filled with blood from the effects of the first operation, I have always used Caustic. I have lost some patients from erysipelas, and a few from tetanus: the latter I believe is a danger unknown here; but in Barbadoes it occurs often enough to make a man avoid operations of every kind as much as he can. Cancer and pulpy testicle are the ordinary diseases of the testis in Barbadoes; but not more common, perhaps than in England. Elephantiasis more frequently affects the scrotum than in Europe, and I have relieved the scrotum when immensely enlarged in this disease by pressure with adhesive plaister.

Believe me, very sincerely your's,

PHILIP CADDELL.

HYDROCELE OF THE SPERMATIC CORD.

This disease is rather of rare occurrence. It may be defined to be an accumulation of fluid in the tunica vaginalis of the spermatic cord, and results from the following abnormal condition of its serous membrane.

When the testis descends from the abdomen, the spermatic cord is closely invested by the peritoneum, which adheres to its vessels; but the portion of peritoneum, which descends before the testis from the lower part of the abdomen, does not at first adhere to that portion which is closely united to it and to the spermatic cord, but a channel, admitting of a probe, is left between the two portions; so that the tunica vaginalis is at first open to the abdomen, from the testicle upwards. But after a certain time, adhesion is produced between the two layers of the tunica vaginalis, from the internal abdominal ring nearly to the testis, and the two portions, appear as one. Sometimes, however, it happens, that in parts of the cord the adhesion is not complete, and then a space is left, in which a slight secretion proceeds; and which, when accumulated, produces at this part, a hydrocele of the cord. A similar swelling may also be produced by an accumulation of fluid in an adventitious cyst in the cord.

The swelling, when seated below the abdominal ring, is easily distinguished from tumours of any other kind. It is globular, and when grasped, and raised, it appears of a light blue colour; it is very transparent; extremely firm to the feel; is unattended with pain; it rarely acquires any considerable size, and is merely an inconvenience to the patient, from the impression it produces upon his mind.

But when this swelling is seated in the spermatic cord above the abdominal ring, consequently within the inguinal canal, it is very difficult to distinguish it from hernia; for it disappears under pressure, is very apparent in the erect, and almost imperceptible in the recumbent posture: but there is however no pain, no gurgling, no interruption to the bowels, as is the case in hernial protrusions. The disease in this situation feels like a bullet lodged in the cord. Left to itself, it increases, and at last emerges at the ring, when its transparency decides its nature.

On dissection of this disease it is found that the bag is covered by the cremaster muscle; but the cavity in which the water is contained, is formed between two portions of the tunica vaginalis of the cord, which are excessively thickened, and have no communication with the cavity of the tunica vaginalis testis, or with the general peritoneal cavity.

The treatment of this complaint may be by injection, by incision, or by the introduction of a seton.

I am of opinion it is best not to inject them; for it is with difficulty done, and the disease is apt to return. This result has happened in my own practice; and the following case, which had been under the care of a very intelligent Surgeon, Mr. Pulley, of Bedford, is a proof that it happens to others.

CASE I.

Master ——, of Bedford, had a hydrocele of the cord, of six years' duration. It appeared in part above, and the greater part just below the ring; it was very transparent. Mr. Pulley tapped it, and it formed again immediately. Mr. P. has twice injected it: first, five years ago; and, secondly, two years and a half since: but the disease returned. I cured it by making an incision, and introducing flour; two abscesses, however, formed during the process of cure.

A seton, passed by introducing a common curved needle through the tumour, carrying a single silk, is, in my opinion, a better operation.

A hydrocele sometimes, I believe, forms on the spermatic cord, from a secretion proceeding in an old hernial sac, which is closed at its orifice into the abdomen; in these cases the fluid is colourless, and contains but little albumen.

CASE II.

I insert this letter, to show the difficulty of diagnosis in this disease.

Copy of a Letter.

"My dear Sir Astley,

"In the year 1813 I received a severe blow on the right testis (by a horse falling with me, in riding over a hurdle), which was followed by acute inflammation, and subsequently by hydrocele of the tunica vaginalis.

"This was cured by injection, and has never returned.

"In the Winter of 1817 I discovered a small moveable tumour in the course of the spermatic cord, in the inguinal canal. I could easily return it into the abdomen; and if I lay supine, it would generally disappear of itself, descending again as soon as I became erect, and rather increasing in bulk after any violent exercise. It was never attended with any pain; and caused me no further inconvenience than uneasiness of mind, and occasionally a sensation of weight and distention. Its size never exceeded that of a marble; but if it was violently squeezed, the sensation extended to the testicle. On consulting —— as to its nature, he said he *believed* it to be an encysted tumour, and took me to ——, who also pronounced it *a cyst.* A few discutient lotions were applied, but without effect. As I was then attending ——'s Lectures on Anatomy, I one day showed it him; and on asking him what he considered it to be, he answered—" A little piece of omentum:" at another time he conjectured that it might be " a third testicle," &c., *as he had heard* of such instances. Chance threw me into the room just then with ——, and my restless mind induced me to consult *him; he* pronounced it at once to be a hernia. Frightened out of my senses, I made the best of my way to ——: and, trembling as though I was going to be flogged, I unbuttoned for the examination, and was cheered by the opposite opinion and positive assurance that it was not hernia. Mr. ——, of Dublin, happening to be in the next room, (and —— desiring ——, who stood by whilst —— was examining me, to hold his tongue) he was told to pronounce what it was. After going through a repetition of the kneading, squeezing, pinching, " Cough, Sir!"

&c., by him, he looked up, and said, "NOT HERNIA." I was then desired to go again to ———, who was told the difference of opinion. He admitted that it wore more the character of what had been pronounced than it now did of hernia: he believed that the opinion of its being hydrocele of the cord might be right. I went to ——— with this budget of opinions:—he remained unaltered in his, and proposed an operation for its removal. He thought that passing a seton through it would be the best plan; and in April, 1818, he did so, taking the precaution of cutting down to it first, in consequence of the difference of conjecture. It proved to be a cyst containing serum, and situated in the tunic of the cord. The seton remained in four or five days. On its removal the wound soon healed, and I have never experienced any return, or further inconvenience. "Thus ends this strange eventful history," of which you must excuse the imperfections. I hope it will be sufficiently accurate to answer your purpose, whatever that may be.

"Your's, very sincerely,

"J. C. B."

CHAPTER XIV.

OF INFLAMMATION OF THE TUNICA VAGINALIS.

In testitis the tunica vaginalis participates in the inflammation of the testicle, and in its result it produces effusion into the tunica vaginalis :—if the inflammation proceed, fibrine is thrown into the tunic, mixed with serum, and by this adhesive matter the two portions of the tunic coalesce.

In hydrocele an opportunity was sometimes given of observing this process, after the operation by caustic; for as a doubt often existed of the efficacy of the process, Surgeons were sometimes induced to open the tunica vaginalis by incision, and it was found distended with fibrine, which looked like jelly, in which serum was in some parts suspended.

If the inflammation be immediately subdued, the effused adhesive matter becomes, in part or entirely, absorbed; but if it continue for some time, the adhesion remains, and produces many of those indurations which are perceived after inflammation of the testis and its tunics.

If the posterior or lower part of the epididymis has a knot formed on it, it is found, by dissection, to have arisen from a condensation, the result of inflammation of the cellular tissue, which unites the convolutions of the vas deferens; and if a hardness be felt on the surface of the testicle, it indicates the existence of partial adhesions of the tunica vaginalis, with thickening of that membrane.

In one case of severe inflammation of the testis, which I had an opportunity of examining, I found, in addition to the adhesion of the tunica vaginalis, adhesive matter poured into the substance of the testis in two situations, the larger part at the rete; but three little solid swellings were also found, at the anterior, and convex edge of the testis.

When the two portions of the tunic adhere, if injection be thrown into the arteries, it passes from one to the other surface through the adhesion, and the new organization is thus easily demonstrated.

No other consequence arises from this adhesion, but that the testis does not glide so easily from the influence of pressure, and is therefore more exposed to injury from violence, which it is less able to elude.

The treatment which acute inflammation of the tunica vaginalis requires, is the recumbent posture, support of the part, leeches, evaporating lotions and brisk purgatives.

The hydrocele which follows this inflammation, often disappears under the use of stimulating lotions.

Suppuration of the tunica vaginalis is a very rare occurrence, excepting as a consequence of hydrocele, and its modes of cure: but yet it is sometimes the natural mode of cure of hydrocele, when the membrane is excessively distended; for it then may occasion inflammation, which, although at first adhesive, becomes suppurative, and terminates in ulceration; the water is then discharged, granulations arise, by which the cavity is filled, and the surfaces of the tunica vaginalis become united.

OF CHRONIC INFLAMMATION OF THE TUNICA VAGINALIS.

In the inhabitants of warm climates, and more especially in those of the West Indies, the tunica vaginalis undergoes a slow and continued inflammation, which gradually produces an effusion of water into its cavity.

In persons who are the subjects of disease in the urethra and prostate gland, in our own clime, the same effect is produced; and indurations, apparently of the epididymis and testis, but often really of the tunics only, with small collections of water, ensue.

In performing operations for hydrocele thus produced, I have found the tunica vaginalis so excessively thickened, that when opened, instead of falling upon the testicle, it has remained separated from the tunica vaginalis testis, leaving a cavity between them; the tunic under these circumstances is stiff and as thick as wetted parchment.

The fluid which is contained, is sometimes, when thus produced, of a white appearance, and opaque; and if it be suffered to remain in the vessel into which it has been drawn, it precipitates numerous white flakes of adhesive matter, which have been poured out during the inflammatory process, while the supernatent fluid is clear and colourless. I first observed this in a gentleman from Barbadoes, whose hydrocele I cured by incision; and have since seen it, in other cases.

In the first of these examples the tunic was completely opaque; which induced me to prefer the operation by incision to the use of injection.

It is generally chronic inflammation of the tunica vaginalis which leads to variety in the situation of the water in hydrocele, and to the danger of wounding the testis in the introduction of the trocar; for in these cases, cysts are liable to be formed in various situations, and the position of the testis therefore, with respect to the water, is very variable and difficult to ascertain, from the absence of transparency in the tumour.

The operation by incision will therefore be occasionally required in those cases where the disease is rendered obscure from the opacity of the tunics, and when more than one bag is formed, in which the water is contained.

CHAPTER XV.

OF THE FORMATION OF CARTILAGINOUS BODIES IN THE TUNICA VAGINALIS.

In dissecting persons who have had hydrocele at the time of their death, I have several times found little loose cartilaginous bodies floating in the serum.

They are sometimes numerous, more frequently two or three, and sometimes only one exists.

They appear at first sight like cartilage; but upon more attentive examination, are found to be cartilaginous on their external surface, but having earthy deposit in their interior.

They resemble those bodies found loose and pendulous within the synovial capsules of joints, which are also cartilaginous on the outside, but contain ossific matter within.

In some cases in which I have found them, I could not discover from whence they had been formed: although there were marks of inflammation in the tunica vaginalis. as well as of adhesion; but still the point of their formation could not be detected.

But in other cases, I have been able to ascertain that their mode of formation was by two processes.

First—They form pendulous bodies hanging from the tunica vaginalis of the epididymis and testis, being covered by the reflected portion; and when the stalk becomes small, they fall, or are broken off during the motions to which the testis is exposed, and from the pressure to which they are so frequently submitted. Of this kind of formation I have given a plate from a preparation in my possession. Vide fig. 1, 2, 3, Plate xiii. Part II.

The second mode in which I have seen them produced, has been upon the surface of the testis in a cyst, between the tunica vaginalis and albuginea, which, when opened, was found to contain one of these little solid bodies, pendulous from its internal surface.

This kind of formation is readily understood and explained.

Inflammation of a chronic kind produces an effusion of adhesive matter between the tunica vaginalis and albuginea. The effusion projects, and is pendulous: it becomes vascular from the vessels of the tunics; and frequently cartilage, and subsequently ossific matter is secreted in its substance.

The curious circumstance is, the propensity of serous and sero-fibrous membranes to form cartilage, and earthy matter; but it is not confined to the tunica vaginalis, and albuginea, for it is often observed in the dura mater, sometimes in the pia mater, occasionally in the pericardium, on the surface of the spleen, and not unfrequently in the sinovial membranes of joints.

With respect to the changes which they produce on the tunica vaginalis, as found after death, they are those of chronic inflammation; but their existence in the living body I have never been able to detect, nor have I ever suspected their presence from any peculiar train of symptoms.

ON OSSIFICATION OF THE TUNICA VAGINALIS.

This state of the tunica vaginalis is but rare, and when it is found, it is usually the concomitant of long-continued hydrocele; for I have seen only a single instance in which they did not exist concomitantly.

The earthy matter is thrown out in patches of different sizes; but in a beautiful preparation of this disease, in the collection at Guy's Hospital, it has been deposited in numerous spiculæ, with which the membrane is in various parts studded.

These various depositions show how much the effects of chronic inflammation may vary: under one action, a serous effusion;

under a second, great thickening; under a third, cartilaginous substances; and from a fourth, earthy concretions result.

The tunica albuginea also undergoes a similar change of structure, as regards the formation of cartilage and earth.

Diseases in the urethra are the most frequent causes of this chronic inflammation; and, consequently, attention to the state of that canal is the principal object to be attended to in checking its progress.

CHAPTER XVI.

OF FUNGOID INFLAMMATION OF THE TUNICA VAGINALIS.

It appears that the tunica vaginalis may, in certain cachectic constitutions, become the subject of fungoid inflammation, of which the following is a good example.

CASE.

Mr. T——, aged 60, rather of a bloated, unhealthy appearance, fifteen months ago observed a swelling on the left side of the scrotum, which was unattended with pain, but was accompanied by a formation of water in the tunica vaginalis. He applied to Sir Benjamin Brodie, who directed the mercurial treatment, the application of leeches, and the recumbent posture; but the swelling was but little influenced by this treatment.

About two ounces of serum was drawn from the tunica vaginalis.

The treatment was still pursued, and a second time the water was removed; but still the enlargement and hardness remained.

I was then consulted, and was of opinion that the same mode of treatment should be rigidly and perseveringly pursued.

After a lapse of several weeks, it was agreed between Sir Benjamin Brodie and myself that the diseased part should be removed, if upon puncturing, the quantity of fluid should be found inconsiderable. On passing a lancet into the part in three different places, although the fluctuation was apparently decisive, no water was found.

The testicle was then removed by Sir Benjamin Brodie; and upon dissection, the following appearances presented themselves:

The testis was perfectly sound. The vas deferens could be injected to the beginning of the epididymis only.

The epididymis was extended to a great length by the swelling, and terminated in a membranous cord.

The cavity of the tunica vaginalis was occupied by a spongy effusion, which had all the character of incipient fungus.

The tunica vaginalis was thickened, and had a considerable portion of ossific matter deposited on it.

The spermatic cord was unaffected.

This patient died of erysipelas; and upon examination, his body was found in other respects free from disease.

CHAPTER XVII.

OF HÆMATOCELE.

Hæmatocele is a collection of blood with or without water in the tunica vaginalis. The swelling is pyriform like hydrocele, is usually free from pain, does not affect the general health, is attended with slight fluctuation, but it is not, as hydrocele, transparent.

It may be known from hydrocele by its greater weight, by its want of transparency, by its obscure fluctuation, but the true nature of the case is most easily distinguished by its being generally the sudden result of a blow upon the part.

A man came to my house in the country, with a swelling in the scrotum, which he said had arisen from his being thrown upon the pommel of the saddle, and that at first the scrotum had been severely bruised, and was of various colours from extravasated blood. The swelling was of the pyriform shape, of hydrocele; but under the most minute examination, it did not appear to be transparent. I therefore made an incision into the tunica vaginalis, and discharged a large quantity of brown-coloured fluid, blood and coagula, changed in colour by long retention. I ordered a poultice, to produce suppuration in the tunica vaginalis, and the patient perfectly recovered.

In the dissection of these cases the tunica vaginalis is found excessively thickened; the blood which is coagulated in its cavity, is coffee-coloured, and if a fluid be contained with it, it assumes the same appearance. The blood in the tunica vaginalis is found in one of three states, according to circumstances:—

First. It may be entirely coagulated.

Second. Some fluid blood is found with the coagulum, and then the swelling is extremely tense; and if opened, a bleeding is apt to occur after the removal of the pressure of the fluid from the orifice of the vessel which had previously bled.

Third. When the disease has been accompanied by inflammation, a serous fluid is secreted, and becomes mixed with the blood of the hæmatocele.

CASE.

Mr. N—— was brought to my house by Mr. Harris, Surgeon, of Gracechurch Street, with a pyriform swelling of the scrotum, as large as a double fist. It had existed seventeen years, had not been attended with any pain, and its size and weight were the only inconveniences of which he complained.

Its cause he attributed to a blow from the pommel of the saddle in hunting, which gave him great pain for a short time.

The testis and epididymis could be felt at the lower part of the swelling; and above it, extending to the ring, a solid substance, united with a fluid, could be perceived. It was not in the least transparent, and he had never suffered any pain in the swelling.

I opened the tumour at my house, September, 1822, and discharged a coffee-coloured fluid blood, and some solid fibrous substance of a brownish yellow colour. The tunica vaginalis was excessively thickened, looking and feeling like the densest parchment. I put in a piece of cotton-wool, and he went home, which was about three miles, in a coach; and on the same day, when imprudently sitting in his counting-house, he was seized with a profuse hemorrhage from the tunica vaginalis, and fainted. He was carried to bed; and next day he had violent constitutional irritation, followed by suppuration of the tunica vaginalis.

The after treatment consisted in applying warm poultices, and in giving a draught with Mag: Sulph: cum Liq: Ammon: Acet: ter quotidie. About the third or fourth day large clots of blood came away, followed by profuse discharges of pus; and the febrile symptoms subsided.

The discharge continued very considerable for a fortnight but without any bleeding, when it began to lessen; during which time he took Decoct: Cinchon: ℥ij. Acid: Sulph: Dil: g^{tt}. x. ter quotidie. Poultices were continued for three weeks, the part elevated with a suspensory bandage and by tying the knees together, which gave exit to the matter; after which, straps of adhesive and soap plaster were applied, and in about six weeks after the operation he was perfectly well.

Hæmatocele now and then follows the operation of tapping a hydrocele, more especially if a lancet be used. Mr. Sherwood, of Reading, informed me that a hydrocele being tapped, some blood escaped after the canula was withdrawn. The lips of the wound were united, and some time after, a fresh hydrocele appeared to be formed, and was to be operated upon by injection; but upon passing the trocar, the tunica vaginalis was found full of blood.

An incision was made into the tunica vaginalis, the blood discharged, and the patient was cured.

Mr. Lewis, Surgeon, in Mark Lane, had a patient whom he had twice tapped for hydrocele. About two months after the last operation the patient returned with the appearance of recurrence of the disease, only that the swelling was somewhat rounder. Mr. Lewis again tapped it, and drew off a pint of thick bloody fluid. In a fortnight the swelling reappeared;

but it has not been since operated upon, and is gradually absorbing.

Hæmatocele is often connected with hydrocele, and may be considered in a great measure as a consequence of it.

A man was brought into Guy's Hospital, who had long had a hydrocele, and had received a severe blow upon it, which suddenly increased the swelling, bruised the scrotum, and produced great pain from distention. I immediately made an incision into it, and discharged a large quantity of water and coagulated blood; and found a rent in the tunica vaginalis between one and two inches in length, covered with a coagulum.

Dr. Saunders, formerly Teacher of Medicine at Guy's Hospital, had a hydrocele, for which he applied occasionally to Mr. Lucas, my colleague at Guy's, to have it tapped. In stepping upon a chair, to reach a book, he fell against the back of the chair, and received a blow upon the scrotum, which led to the recurrence, as he thought, of his hydrocele: and in a few days he went to Mr. Lucas, to have it tapped; but upon the introduction of the trocar, no water passed. The Doctor then consulted several Surgeons. Mr. Cline made an incision into the part, and the tunica vaginalis was found full of blood, which being discharged, a poultice was applied, and he soon recovered.

Mr. H——, who had a hydrocele in each tunica vaginalis, was thrown upon the pommel of a saddle, by the fall of his horse. Although he suffered scarcely anything at the moment, yet the scrotum began to swell, increasing rapidly from the very instant the accident occurred. The swelling was soft; but on the following day it became solid, so that at first the blood was fluid, but in a few hours it coagulated.

The whole scrotum appeared as one mass of ecchymosis.

The Surgeon whom he consulted, applied leeches, and a poultice, with the material of which I am unacquainted. He then ordered a lotion, and next applied a plaster upon the part.

The patient consulted me in March, 1828. The accident happened a month before; and when I first saw him, each tunica vaginalis was distended; the right was in part solid and in part fluid; the left only contained a fluid.

I put a lancet into the tunica vaginalis on the right side, and discharged a fluid, which at first had the appearance of venous blood, but upon more particular examination, it seemed to consist of extravasated blood mixed with serum, the fluid drawn off being of a chocolate-brown colour. A large coagulum remained, and the testicle, as far as I could judge, was swollen: the discoloured fluid evacuated had not the least putrid smell.

The history of this case seems to have been that blood was first extravasated, the whole of which became coagulated; it then separated the serum, which became larger, and larger, in quantity, and the coagulum itself gradually diminished in size.

I saw this gentleman many months after, when the hydroceles had each of them returned;—although certainly the solid matter was diminished, yet a small portion still remained.

Hæmatocele is not always produced by a blow. I attended, with Mr. Hicks, a gentleman in Bond Street who had a large pyriform swelling in the left tunica vaginalis, which had never been painful, and which had an obscure fluctuation, but was not transparent. I made an incision into the swelling, in the presence of Mr. Hicks, and discharged nearly a pint of fluid blood. This swelling had not succeeded a blow; but Mr. Hicks imputed it to excessive exertions which this gentleman had been in the habit of making.

The following case was communicated to me by my Nephew, Mr. Bransby Cooper.

Mr. R—, æt. 60, was the subject of hydrocele on the left side, which he permitted to acquire a very considerable size before he consulted any Surgeon; this he ultimately did in consequence of the inconvenience he sustained from the bulk of the tumour. The fluid was drawn off but no injection was used, as Mr. R— was unwilling to submit to the radical cure, preferring the repetition of the palliative remedy for his relief. Having had the fluid drawn off upon two or three different occasions, Mr. R—

began to contemplate the expense he was thus incurring, and thought he should be able, by an invention of his own, to perform an operation, which appeared to him so simple.

He accordingly manufactured an instrument with considerable ingenuity, composed of a kind of lancet enclosed in a canula, which he attached to the handle of a pistol, and by a spring made it obedient to the motions of the trigger. With this apparatus he most successfully performed the office of his Surgeon, chuckling at the same time at the idea of having "done the Doctor." The accumulation of fluid, however, soon recurred, when with great confidence, the self-conducted operation was again had recourse to, and apparently with similar success as before, as the fluid was readily withdrawn and all augured well. In an hour after the operation, Mr. R— was rather surprised to find the tumour again beginning to develope itself, and upon frequent successive examinations became somewhat alarmed at finding it progressively growing to its former size, and infinitely increased in weight. He immediately applied cold water, remained for a length of time in the recumbent posture, and thus checked the threatening unlimited growth of the swelling. In a few days the enlargement was somewhat diminished, so as to remove in a great measure the fears which had been created, and Mr. R— endured his malady for four or five months without consulting any medical man. At the expiration of this time, finding the swelling permanent and solid, he considered it better to place himself under the care of a Surgeon, who, explaining to him the nature of his disease, laid open the tunica vaginalis and removed a clot of fibrin, which weighed nearly a pound. The tunic was much thickened but it granulated, and the patient perfectly recovered, and became convinced it was both cheaper and safer to trust to science than ingenuity.

CASE.

Mr. H—— had a hydrocele on each side of the scrotum. He had a swelling on the right side, and the water was drawn off by a lancet, but in a few days it was larger than ever, and much harder than before.

Two years after this he applied to me. The swelling on the right side was not transparent, but on the left it was so.

I suspected the presence of blood in the tunica vaginalis from the former operation; and, puncturing the tunic, fluid blood, having a coffee-coloured appearance, was discharged, without any coagulum.

The tunica vaginalis was excessively thickened, but the testicle appeared to be sound. Very considerable, I may say, dangerous irritation followed this operation, although he ultimately recovered.

There is in the collection at St. Thomas's Hospital, a preparation of a hæmatocele, which had been mistaken for a diseased testicle, and the healthy organ removed.

The case had assumed some of the symptoms, and appearance of a diseased testis, and the Surgeon determined upon its removal. I took the removed parts to St. Thomas's Hospital to dissect; for the Surgeon who had removed them, had not even the curiosity to examine the disease.

When I opened the tunica vaginalis, I found it most excessively thickened, and filled with coagulated blood, of a brownish red colour.

The testicle was placed at the posterior and lower part of the swelling.

TREATMENT.

The treatment of hæmatocele must depend upon the manner in which the disease had been produced. If it has been the result of a blow, and unaccompanied by hydrocele, the best plan is, to order the person to observe the recumbent posture, to apply leeches, to keep the bowels open, and if there be much pain and irritation, to take away blood from the arm: the scrotum should be kept moist with a lotion composed of Liq: Ammon: Acet:

and Sp : Vini, so as to keep the part cool, and restrain the further disposition to hemorrhage. This application prevents inflammation, and at the same time stimulates the absorbents to remove the extravasated blood; but if hæmatocele be connected with hydrocele, unless the inflammation be considerable, the best plan of treatment consists in making an incision into the part, and discharging the contents of the tunica vaginalis; and, without introducing any extraneous matter, to leave the case to the natural process of inflammation. When it occurs as it were spontaneously, without any other cause than the muscular exertion of the patient, there is reason to suspect something wrong in the constitution of the individual, often indicating an hæmorrhagic tendency, to which the Surgeon ought to attend, as well as to the local treatment of the disorder. There is in these cases generally visceral disease, more especially of the liver; sometimes impediment in the circulation through the chest; and when this state has been remedied by medicine, the patient may be relieved by an incision into the tunica vaginalis. The recumbent posture is in this case very essential, in preventing the vessels from again bleeding, when the contents of the tunica vaginalis have been removed.

In hæmatocele it is especially necessary to lay open the tunica vaginalis sufficiently, to examine well the state of the testicle, as castration has in some cases been performed by mistake, and the testis found perfectly sound.

Excessive irritation sometimes follows the incision into the tunica vaginalis for this disease, it therefore behoves the Surgeon strictly to watch the patient after the operation has been performed.

CHAPTER XVIII.

OF VARICOCELE.

The spermatic veins, from their length in consequence of the pendulous position of the testicles, are liable to great variation in the quantity of blood which they contain, and their fitness to return it.

In the erect position they become distended with blood, while in the recumbent posture they are comparatively empty.

From general relaxation of the body also, whether produced by heat or by feebleness, the spermatic veins become loaded, their coats yield to the pressure of the column of blood, and the inhabitants of warm climates therefore are very subject to varicocele.

Corpulency is another precursor and cause of this disease, as, by the pressure of accumulated fat in the mesentery and the omentum, the free return of blood is prevented in the veins.

Pressure from dress, as a belt worn round the abdomen, by obstructing the return of blood, is another cause of this complaint.

That it occurs more frequently upon the left, than upon the right side, must have struck every observer; and the reason for it results from the termination of the spermatic vein on the left side, differing with that on the right, as on the right side it enters the vena cava inferior, nearly in the course of the blood towards the heart; whilst in the left side it terminates in the left emulgent vein, nearly at right angles with the stream of blood from the kidney, and therefore some resistance is offered to the return of blood from the left spermatic vein, and moreover the sigmoid flexion of the colon, when distended, presses upon the spermatic vessels on the left side.

Another cause may be also assigned for it; for the left testicle usually hangs lower than the right, and hence the veins are somewhat larger, and the column of blood of greater height.

Whatever may be the cause, the effect which is produced is to increase the diameter of the veins and thus destroy the influence of their valves, to render them much more tortuous, and to thicken their coats, so that the spermatic cord on that side is thicker and fuller than on the other.

Varicocele, under common circumstances, scarcely deserves the title of a disease; for it produces, in the greater number of cases, no pain, no inconvenience, and no diminution in the virile powers. One of the first of my medical acquaintance at the Hospital had a slight hydrocele on the right side, and a varicocele on the left; yet he married, and had a numerous offspring.

In a few examples, however, it produces uneasiness in the loins, and in the course of the spermatic cord.

But it almost invariably has a great influence over the patient's mind. He thinks himself labouring under some serious infirmity, and that it will ultimately render him impotent; and this imaginary evil tends to render a feeble mind wretched. He consults one medical man after another, in the hope of finding a cure, until his apprehensions are worn out, or his experience teaches him his error.

I have now and then seen this disease situated on the right side, and not on the left, and I have also known it exist on both sides at the same time, but the latter is of rare occurrence.

DISSECTION.

Upon dissection, all the veins are found to be enlarged, and so much elongated, that the vein which is situated in the course of the vas deferens reaches much lower than the testicle itself, so that the testis is seated on its fore-part, and there is much of the varicocele below it.

In correspondence with all preternaturally distended vessels and varicose veins in other parts of the body, their coats are thickened, as if the effort of nature, to enable them to bear the additional column of blood; this thickening is the result of inflammation, set up in the parieties of the veins, in consequence of their over distension.

DIAGNOSIS.

Varicocele is liable to be confounded with hernia; and there is, in fact, frequently, a sufficient similarity of symptoms to lead to this error, in Surgeons who have not had ample opportunity of comparing the two diseases.

A varicose, like a hernial tumour, fills from the abdomen, and descends towards the testicle. They both increase in the erect, and almost disappear in the recumbent posture; and like hernia, when varicocele is very large, it distends when the patient coughs; but in general this latter symptom is not sufficiently obvious to form a very distinct diagnostic mark.

Varicocele is, however, unlike hernia on its surface, for it feels like a bag of worms in the scrotum, between which the fingers sink and meet, instead of presenting the smooth and uniform swelling of hernia.

It is unaccompanied with interruptions of the bowels, and unattended with the gurgling sensation of intestinal protrusion.

Yet again and again I have seen trusses applied for this disease, which not only cannot benefit, but on the contrary, must necessarily have a pernicious influence, by further preventing the free return of blood from the testis, and consequently increasing the disease.

The mode of distinction is, however, easy to the Anatomist and Pathologist; it consists in directing the patient to place himself in the recumbent posture, and in elevating the testicle until the veins are emptied, the Surgeon presses the abdominal ring firmly with his finger, and directs the patient to rise; upon which the spermatic veins again rapidly fill, while a hernia would be prevented from descending. This phenomenon results from the blood still flowing to the testicle by the spermatic artery, and being prevented returning by the veins, the varicocele again swells.

TREATMENT.

In varicocele it is the object to prevent its increase, and to remove any resulting inconveniences.

To effect these benefits the scrotum should be supported by a suspensory bandage composed of a silken bag, so adjusted as to raise the scrotum, and to press upon the veins sufficiently, to lessen the quantity of blood determined to them, as well as to support the column they contain. Every attention should be paid to the keeping the scrotum cool, evaporating lotions should therefore be applied, the suspensory bag should be of net-work, and the patient's dress thin and light to prevent any accumulation of heat about the parts.

All pressure from the clothes on the abdomen should be prevented, as it necessarily retards the return of blood, and increases the distension of the spermatic vessels. General cold-bathing is useful, by invigorating the constitution ; and the patient should bathe the part night and morning with cold water, in which a mixture of Nitre and hydrochlorate of Ammonia are dissolving.

When the veins are very much distended in varicocele, and produce much uneasiness from their size, I have known great advantage derived from the application of blisters to the scrotum, or any stimulating agent which has a tendency to produce inflammation and thickening of the skin ; they act, I believe, by inducing a deposition of adhesive matter in the sub-cutaneous cellular tissue, and thus maintain a permanent pressure upon the enlarged veins.

But varicocele, under the usual concomitant circumstances, need cause but little apprehension in the mind of the patient, and the Surgeon may assure him, it is a matter of but little importance, and confidently speak of the ready means there are of preventing the increase of the disease, and of maintaining the natural functions of the implicated structures; nothing being required but to support the part, to apply cold lotions, and to wear his clothes loosely around his body.

It may also be said, to relieve the patient's mind from anxiety, that varicocele is so common, that probably one person in every twenty has the complaint in some degree, without any injury either to his health, or powers.

It does, however, in some few cases happen, that persons suffer great pain in the testis and loins from a varicocele, so as to require surgical treatment, and it has been proposed to tie the spermatic vein, by cutting down upon the vessel, and placing a ligature around it; an operation which I should never recommend, as it cannot be performed without great hazard to the life of the patient. Operations upon veins, from their great irritability, are more dangerous than those on arteries, and more liable to set up an inflammation which sometimes extends even to the heart itself. A suppurative inflammation of their inner coats, I have several times seen destroy life after tying veins in operations on the extremities.

The removal of a portion of the scrotum will lead to a diminution of the veins of the spermatic cord; and it is an operation, in an extreme enlargement, although accompanied with pain, which might be tried with perfect safety, and is very likely to succeed.

Since the publication of the former edition of this work, Sir Astley Cooper has several times performed the operation of removing a part of the scrotum in severe cases of varicocele, with the view of converting the remaining lessened portion of the scrotum, into a permanent support, and of thus rendering a suspensory bandage, unnecessary.

The following is the account of the operation as recommended by Sir Astley Cooper; and subjoined, is a report of some cases, in which it has been performed.

The patient having been placed in the recumbent posture, the testis is to be raised to the external ring by an assistant; and then, a portion of the relaxed scrotum being drawn between the fingers of the surgeon, is removed by the knife or knife-scissars; —I prefer the former. Any artery of the scrotum which bleeds is to be tied; and afterwards, in making the suture, the lower edge of the diminished scrotum is to be brought up towards the abdominal ring, so as to raise, and support the testis. The patient should be kept for a few hours in the recumbent posture to prevent any tendency to bleeding: and then a suspensory bag is to be applied, in order to press the testis upwards, and to assist in gluing the scrotum to its surface. When the wound has healed, the varicocele is lessened, but not always entirely removed; the pain and distressing sensations, however, cease, provided that sufficient of the scrotum has been removed. The only difficulty, indeed, in the operation, is that of ascertaining the proper quantity of the scrotum to be removed; and I have failed in producing the desired result, from having removed only a portion which has afterwards proved to be insufficient. It adds, however, but little to the suffering of the patient if a second portion be taken away, should the first not make sufficient pressure on the spermatic cord.

CASE I.

Mr. Rees, Surgeon, in Blackfriars' Road, sent to me a patient of his, who had a large varicocele on the left side, with a very relaxed scrotum. He suffered severely from uneasiness in the spermatic cord and in the loins, a sense of weight and oppression in the region of the stomach, and excessive mental depression. On the 18th of February, 1831, I removed a large portion of the scrotum; and exposed the fascia covering the cremaster, and the testis in its envelopes. The edges of the scrotum were approximated by three sutures, and the wound quickly healed; and on the 3rd of the following March, the patient quitted London.

Through the kindness of Mr. Rees and Mr. Webster, I have received the following account of the result of the operation :—

"Dear Sir,—

"The gentleman on whom you operated was thirty-two years of age. The portion of the scrotum removed, when extended, measured four inches in length ; and in breadth, in the middle, two inches and a half. He left London perfectly well, and I have sent you his address.

"I am your obedient servant

"John Rees.

"240, *Blackfriars' Road.*"

From Mr. Webster I have since learned the following particulars :—

"The gentleman is able to ride fifty miles a day, without inconvenience ; although, before the operation, he could not continue on horseback more than two or three miles : and in a letter which Mr. Rees has received from him, he expresses himself in the highest terms of gratitude for his recovery."

CASE II.

Mr. S——, aged twenty, has for three years and a half suffered from a spermatocele, attended with great sense of uneasiness in the part, and a dull heavy pain in the spermatic cord and loin on the same side. My assistant, Mr. Balderson, held the scrotum between his fingers; and I removed all that could be easily elevated from the testis and its coverings; which are necessarily exposed in the operation. Having secured some small bleeding arteries, I brought the integuments together by sutures, so as to close the wound completely; and, the scrotum having been placed in a suspensory sling, I ordered the patient to keep himself cool, and to remain in the recumbent posture. The next morning, however, he went down to breakfast: notwithstanding which imprudence, he quickly recovered from the operation, with the result of which he was highly pleased. The coverings of the testis became adherent to the upper part of the scrotum; the varicose veins greatly reduced, the pains in the spermatic cord and loins disappeared, and he soon gave up the use of all artificial support.

CASE III.

H—— B——, aged eighteen years, has had a spermatocele upon the left side, from the age of fourteen. When fifteen years of age he fell across an iron bar, which greatly hurt him, and induced, in his opinion, a speedy increase of the disorder. He suffered much from pain in the testis, more especially in walking, and from uneasiness in the groin, spermatic cord, and the spinous process of the ilium and loins. Several medical men whom he consulted told him his complaint was a hernia, but Mr. Taunton, of Hatton Garden, to whom he was afterwards recommended, informed him of its true nature, and directed the scrotum to be supported, and an evaporating lotion to be used.

On July 20th, 1837, in the presence of Mr. James Babington, I removed a large portion of the relaxed scrotum covering the swelling, and having secured some small arteries, approximated the divided edges by means of four sutures. He was sent, in a coach, to Chelsea, after the operation; and the scrotum very soon healed, and the uneasy sensations, which he had previously experienced, disappeared.

CASE IV.

Mr. John K——, aged twenty-five, four months ago noticed an enlargement of his scrotum on the left side, and occasionally experienced in the part a darting pain which extended upwards to the external abdominal ring. The diseased side of the scrotum became gradually enlarged, until it exceeded the opposite side by three times its bulk: it became more painful, and occasioned to the patient much depression of spirits. On the 15th of October, 1837, I removed a portion of the scrotum, by passing a needle and thread through it in three different places, and cutting away the scrotum beyond them. This plan did not facilitate the operation, and made the tying of the arteries more difficult; but it succeeded in relieving the disease.

The following case occurred in the practice of Mr. Bransby Cooper, and on being laid before Sir Astley Cooper, drew from him the following note:—"The case of spermatocele you have sent me for my inspection is singularly gratifying to me: the operation has been more successful than in any instance in which I myself have performed it."

CASE V.

"About three months ago, I was consulted by a young farmer from the Isle of Sheppey, who had been the subject of a spermatocele of the left side for more than two years, accompanied with an unusual degree of corporeal and mental suffering. Upon examination, I found the scrotum nearly double its natural size, and on the diseased side so pendulous as to reach a third lower than on the opposite side. The spermatic cord between the testicle and the external ring, presented the appearance of an irregularly formed tumor; which was readily diminished in size by gentle pressure towards the abdomen, or by the recumbent posture. The enlarged veins exhibited their characteristic sensation to the fingers. The slightest manipulation produced considerable pain, both in the testicle and in the course of the cord; and the testicle itself was wasted, and denoted all the usual signs of an irritable condition. Within the last two months some slight enlargement, accompanied with pain, has commenced in the right spermatic vessels, which were, at the time of the examination, abnormally distended.

"Having employed all the usual remedies, but without effect, I determined to attempt a radical cure by the excision of a portion of the scrotum. I performed this operation, assisted by my friend Mr. John Birkett, on the 8th of February, in the following manner. The patient being placed in the recumbent posture at the foot of the bed, the enlarged veins of the left spermatic cord were emptied of their blood; when Mr. Birkett drew the relaxed skin of the scrotum tightly between his fore and middle fingers, so as to press the testicle closely against the external ring with the back of his hand. I then, with one sweep of the knife, removed the whole of the skin restricted by Mr. Birkett's fingers, taking care to avoid the septum scroti; and thus exposed the tunica vaginalis, from which alone the left testicle now received any covering. The bleeding being very inconsiderable, I immediately proceeded to bring the edges of the incised skin together, by raising the lower portion towards the upper, and maintained the coaptation by three or four sutures;

by which means I diminished the size of the left side of the scrotum, so as to form a close envelope to the testicle. The parts were then supported by adhesive plaister and bandages, pretty tightly applied; and the whole was enveloped in linen kept constantly moistened with cold water.

"On the 4th of March* this patient had become perfectly convalescent, the wound nearly healed, and the scrotum sufficiently contracted to form a close and firm compress to the testicles; more so on the left than on the right side, although a considerable diminution was obvious on both. The spermatic cords were neither of them larger than natural, but much firmer; all the appearances of varicocele had disappeared, and none of the former symptoms remained. The progress of recovery in the above related case, seemed to show, that the excision of the portion of scrotum had induced the cure by exciting inflammation and consequent obliteration of the diseased veins; and this, without the same risk as attends upon the application of any immediate means to the veins themselves, such as ligature or the excision of the varix."

The report of the next case was sent by Mr. Key to Sir Astley Cooper:—

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* For a detailed report of the case, see Guy's Hospital Reports, No. viii., p. 201.

CASE.

"In the autumn of 1837, a young man, aged 18, suffering much from a painful varicocele, applied to me, to know, if I would advise him to submit to the operation of tying the veins, which had been recommended by a surgeon. The varicocele, which was on the left side, was large and more than usually pendulous; the veins forming a large festoon, that could be distinctly felt through the scrotum. I explained to him the risk and inefficiency of an operation on the veins, and also the simple operation which you had practised for the cure of varicocele. The pain that he experienced in following his occupation induced him at once to have the operation performed. With the assistance of my dresser, Mr. Whitchurch, I removed about two inches of skin, so as to shorten the scrotum from above to below. The edges of the wound were secured by pins; but an oozing of blood into the cellular membrane interfered with the process of adhesion, and the whole healed by granulation. The relief which he has thus obtained, since the wound closed, will induce me to have recourse in future to the operation, for a painful varicocele. The support which the veins would have received if the wound had healed by adhesion would have been more effectual; and I should in another Case take every precaution to ensure the adhesive process."

In another case, under Sir Astley Cooper's own care he raised the scrotum, and placed a ligature tightly around the part which he intended to be removed; but it sloughed with considerable constitutional irritation, after a great length of time, and with great suffering to the patient.

The following are the concluding remarks of Sir Astley Cooper. "I wish it to be recollected that I only recommend the removal of a portion of the scrotum in those cases of spermatocele in which the patient suffers great local pain; in cases in which he is himself most urgent to have the swelling and deformity of the part removed; more especially in those instances in which the function of digestion suffers, and where there is a great degree of nervousness and mental depression. For slighter cases, a suspensory bandage should be still recommended."

The removal of the testicle has in some few instances been had recourse to, to relieve the continued inconvenience and pain of a varicocele.

Mr. Key, in the following case of variocele, was requested by the patient to remove his *testis*.

CASE.

T. H——, aged 18, was admitted into Guy's Hospital under his care in June, 1826, for an enlargement of the veins of the spermatic cord, accompanied with considerable pain.

About three years ago, whilst he was in the act of mounting a horse, the animal sprung forward, and in his descent upon the saddle, his left testicle was much bruised, and produced for a few minutes excruciating pain.

In a fortnight the effects of the accident had nearly subsided; but from this time he remarked that the testicle felt softer than the other, and occasionally gave him pain along the cord; and he also imagined that the gland gradually wasted. Till within the last six months, it had not given him much inconvenience; but latterly it has begun to swell, and has become more painful when he was engaged in any active employment.

The part now presents an irregular knotty swelling at the superior and back-part of the testis, extending some little way up the cord, and it conveys to the hand the impression of a bundle of cords with knots tied in them.

The testicle is soft, and not so large as the other, and gives pain when handled. The pain is chiefly referred to the loins.

The swelling in the veins has the usual character of varicocele, dilating on coughing, and increasing in the erect position of the body.

At his earnest request, the operation of removing the testicle was performed, after the ineffectual application of sedative local remedies, leeches, and a continued horizontal posture, with alterative remedies.

It was at one time suggested that a ligature on the spermatic vein might succeed in curing the varicocele; but the natural irritability of the patient's constitution forbade such an operation.

CHAPTER XIX.

OF THE CHIMNEY-SWEEPER'S CANCER.

This disease has always appeared to me to be one of the most anomalous to which the human body is liable. The person who is brought up as a chimney-sweeper, besides being exposed in his childhood to the horror and apprehension of climbing to dangerous and giddy heights, in his boyhood suffering great cruelty and severe deprivations, and in his manhood being almost an alien from society, is rendered liable to a disease which if not altogether the result of the loathsome pursuit in which he is engaged, he is at any rate made susceptible of from the peculiarity of his altered constitutional powers.

The soot, to the application of which he is constantly exposed, harbouring in the wrinkles of the skin, in a part where the cuticle is thin, and the cutis highly vascular, produces in many of these persons an irritation, followed by an ulceration, which bears so strong a resemblance to cancer, as to have received that appellation; and it certainly does strongly resemble cancer of the lip, in several of its characters.

This disease I have only seen in two parts of the body, upon the scrotum and upon the cheek. In the former situation it is very frequent; in the latter I have only seen it in two instances, in one of which the sore was seated in the centre of the cheek, in a very old man, whose face was wrinkled from age, and therefore liable to retain a quantity of soot, which irritated and subsequently ulcerated the skin, until it produced a train of symptoms I shall directly describe. In the second case, the disease began on the cheek, near the angle of the mouth, and extended both to the upper and under lip. Mr. Keate informed me he had also known an instance of the disease occurring on the cheek.

The first appearance of the disease in its most frequent situation, is a warty excrescence upon the scrotum. Upon this wart, an incrustation forms, and continues to cover its surface. If this incrustation be rubbed away, or picked off, the papillæ of the wart, appear excoriated, red, and broken, and emit a slight ichorous discharge. An incrustation again appears upon the wart, which remains until accident, or the progress of ulceration, removes it, and then the surface appears highly vascular, and discharges a bloody serum. Again the ulcer becomes encrusted, until at length the disease involves a considerable portion of the scrotum. When the sore is carefully examined, it will be found to be hard, its edges indurated and everted, and its surface unequally vascular, so that it is yellow in some parts, more red and injected in others. It generally discharges a bloody serum, the smell of which is often very offensive; but sometimes the secretion assumes a purulent character.

At the commencement of this disease the patient complains rather of a troublesome itching than of actual pain; but as the disease advances, sharp darting sensations, attended with heat, shoot through the part, the usual characteristics of malignant disease. As the ulceration proceeds, it gradually extends to the tunica vaginalis, which in its turn becomes affected, and ultimately the testicle itself becomes involved in the disease. During this progress of the complaint the absorbent glands of the groin are liable to become hard and swollen, and subsequently to ulcerate, when they discharge a bloody serum, sometimes mixed with purulent matter. As the ulceration of the glands proceeds, they present elevated and everted edges, and the surface of the ulcer is covered in one part with serum, in another with white sloughs, presenting an appearance of curdlike matter, according to the structures which have been exposed. When the testicle has become involved in the disease, it is not unfrequently observed that the lumbar glands become hard and swollen. No known remedy seems to be capable of checking the progress of this action, and the ulceration will be seen day by day increasing, either as in the groin by forming deep excavations, or as sometimes happens, by extending itself superficially over a large surface. In the former case large branches of the femoral artery are not unfrequently laid open, and the patient's life destroyed by free and sudden hæmorrhage; while in the latter case life is slowly exhausted by the high degree of constitutional irritation, as well as the debility induced by the excessive discharge. The morbid appearances of the portion of scrotum implicated in this disease bear great resemblance to those of the cancerous affection of the lip, namely, superficial warty granulations, while deeper seated are found numerous deposits of white scirrhous matter, possessing but little vascularity, and arranged in the form of fibrous striæ, which appear to radiate from the centre to their circumference. On examining the diseased glands in the groin, they are found to have undergone a very similar change in their structure to that above described as found in the diseased tissues of the scrotum. The cellular membrane surrounding these ulcerations is also found filled with a deposit, corresponding in its character to that found immediately beneath the ulcer itself.

From the number of persons who pursue the occupation of sweeping chimnies, and the comparatively few affected by the application of the soot, it would appear that there is something peculiar, either in the constitution or the parts of some individuals, which disposes to the production of the disease. Age seems to have but little influence, for I have known it occur as early as twenty-six, and as late as at eighty years of age. I am inclined to believe that it depends more upon local circumstances than upon the constitution; because the subjects of it appear to be very healthy at the dawn of the disease, although they lose that health in the progress of the complaint. Some of them are, it is true, very intemperate, and are thus rendered susceptible from their irritability. But still I believe that it is in persons having a thin cuticle, and an irritable skin, that the soot produces its peculiar irritation and morbid influence; and that the disease spreads by simple extension of surface, as well as by irritation continued in the course of the absorbent vessels.

Medicine has no power over this disease, at least not any that I have tried; and all local applications, used with a view directly to heal the part, are of as little avail.

There are only two modes of procedure—the one to attempt the destruction of the disease by inducing sloughing, the other to remove it by excision.

For the first object a dram of the Oxyd. of Arsenic, well mixed with one ounce of the Ceratum Cetacii, is to be thickly spread upon lint, and applied upon the sore, upon which it is to remain for twelve hours, and is to be succeeded by a poultice. A slough is thus produced, which separates in a few days, and exposes a new surface; but if at any part the old and malignant character still appears, the Arsenic must be again applied, until an entirely healthy surface presents itself. If the glands of the groin be enlarged or hardened, the above application should not be employed, as it will prove a source of additional irritation to them. If the disease be removed by the knife, the operation is a simple piece of dissection. Enlarged glands in the groin are not positively to forbid the operation, as they are sometimes increased from simple irritation only; and as the removal of a portion of the scrotum causes but little pain, is soon performed, and unattended with danger, the patient should have this chance of recovery given to him.

If the tunica vaginalis participate in the disease, it will require great care in its removal, to prevent injury to the testicle itself.

After the removal of the diseased portion of scrotum, the vessels are, although small, apt to bleed profusely, and to be with difficulty stopped by pressure: it is therefore desirable to secure every small vessel which bleeds freely, and not to apply any dressing upon the part, or to suffer the patient to get into bed, until the bleeding is arrested; but he should be kept cool, and in the recumbent posture. When the bleeding has ceased, the edges of the wound may be brought together by sutures.

Mr. Earle has given a good paper upon this subject in the Medico-Chirurgical Transactions.

PLATE 1.

Fig. 1

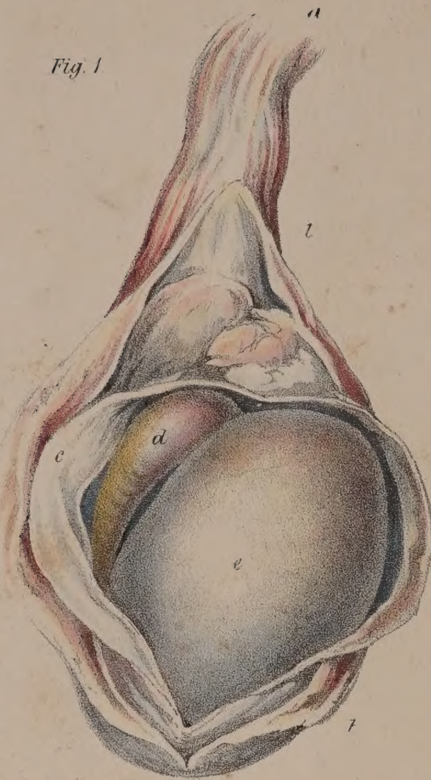


Fig. 7

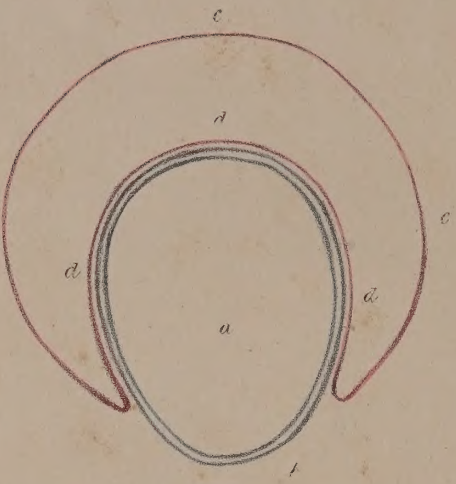


Fig. 2

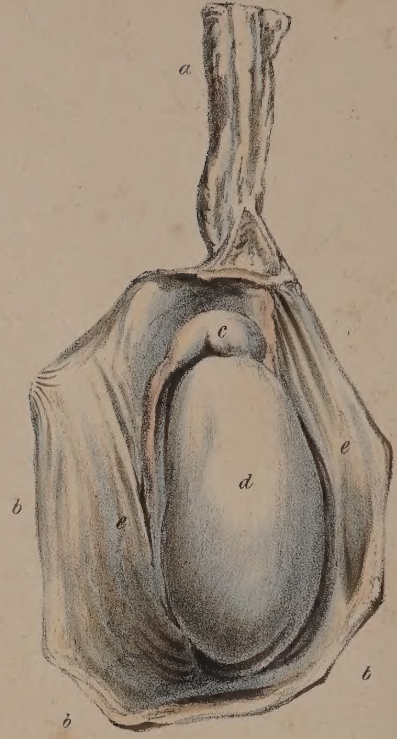


Fig. 4

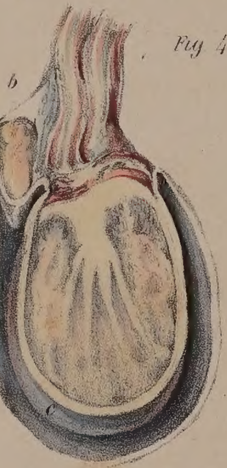


Fig. 5

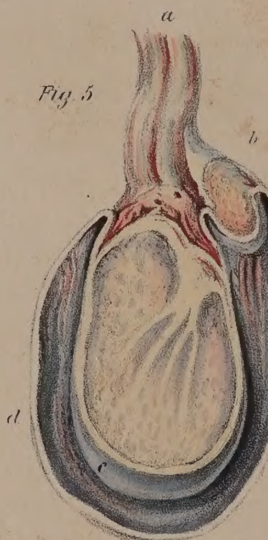
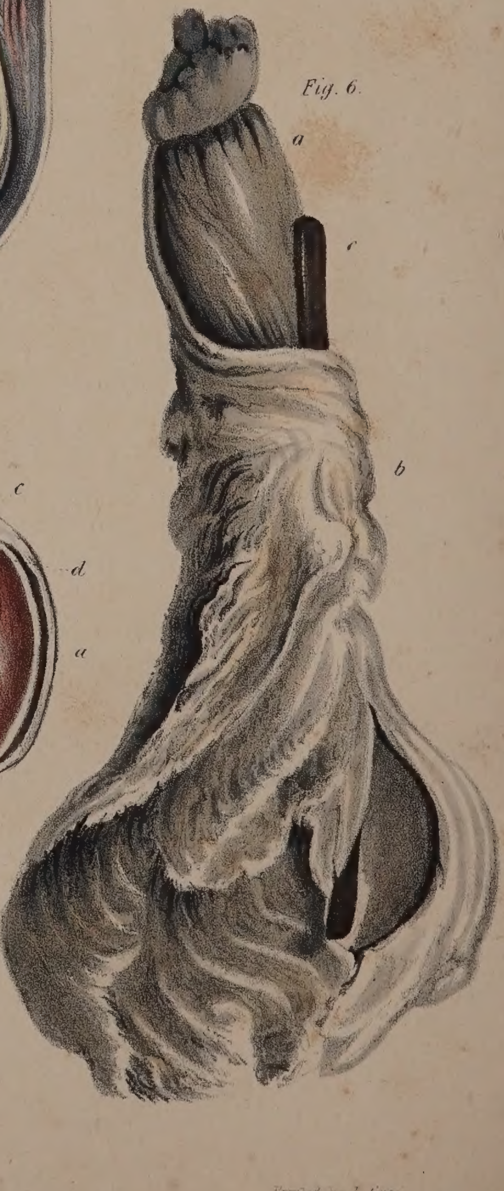


Fig. 6



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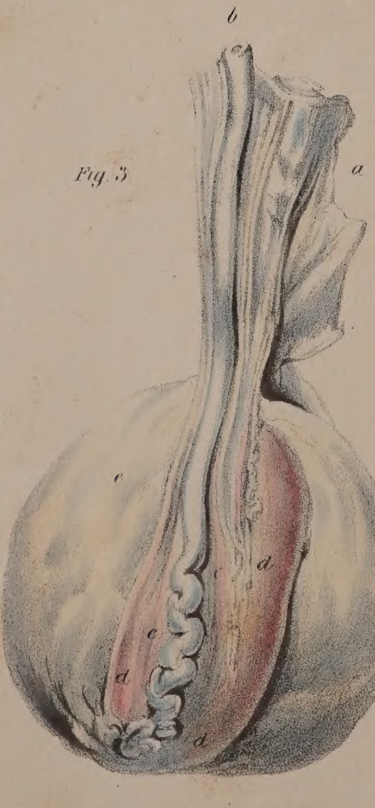

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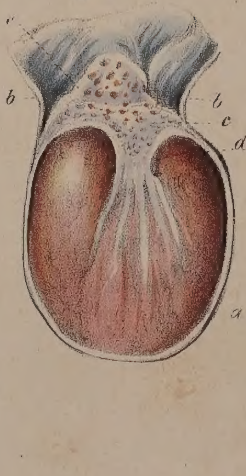

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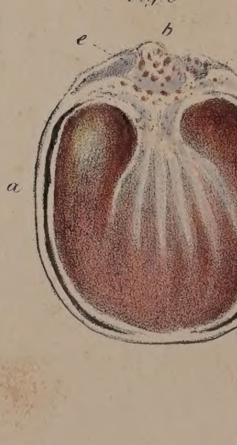

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PLATE I.—PART I.

DIFFERENT VIEWS OF THE TUNICA VAGINALIS AND TUNICA ALBUGINEA.

Fig. 1, The tunica vaginalis :—
a, spermatic cord.
b b b, cremaster.
c c, tunica vaginalis reflexa.
d, tunica vaginalis on the epididymis.
e, tunica vaginalis on the testis.

Fig. 2.—Front view of the tunica vaginalis and testis :—
a, spermatic cord.
b b b b, tunica vaginalis reflexa.
c, epididymis covered by the tunica vaginalis.
d, testis covered by the tunica vaginalis testis.
e e, serous cavity.

Fig. 3.—Posterior view of the testis and tunica vaginalis :—
a, spermatic cord.
b, vas deferens.
c, cords of the vas deferens, or its ligaments.
d d d, testis devoid of the tunica vaginalis.
e e, tunica vaginalis reflexa.

Fig. 4.—Section of testis and epididymis of the right side.
a, spermatic cord.
b, epididymis.
c, tunica vaginalis testis.
d, tunica vaginalis reflexa.
e, tunica vaginalis testis and epididymis.

PLATE I. CONTINUED.

Fig. 5.—Left testis :—
a, spermatic cord.
b, epididymis.
c, tunica vaginalis testis.
d, tunica vaginalis reflexa.
e, point of reflexion of the tunica vaginalis.

Fig. 6 shows the tunica vaginalis open to the abdomen :—
a, spermatic cord.
b, tunica vaginalis reflexa.
c, bougie in the opening between the tunica vaginalis and tunica vaginalis reflexa of the cord and testis.

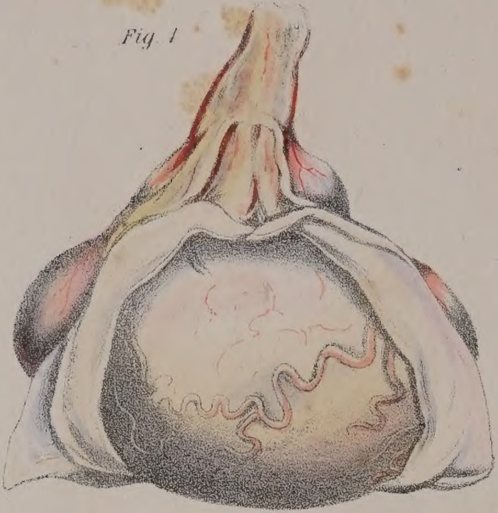
Fig. 7.—A diagram of the reflexion of the tunica vaginalis :—
a, testis.
b, tunica albuginea and back of the testis, devoid of the tunica vaginalis.
c c c, tunica vaginalis reflexa.
d d d, tunica vaginalis testis covering the surface of the tunica albuginea, and incorporated with it.

Fig. 8 is a section of the testis showing its transverse diameter :—
a, tunica albuginea.
b b, tunica vaginalis.
c, mediastinum.
d, apertures of the canals of the rete.
e, mouths of arteries and veins.

Fig. 9.—A similar section :—
a a, tunica albuginea, with the vascular membrane which lines it.
b, parts of the spermatic cord.
c, mediastinum.
d, orifices of the canals of the rete.
e, arteries and veins at the upper part of the mediastinum.

PLATE 2

Fig. 1



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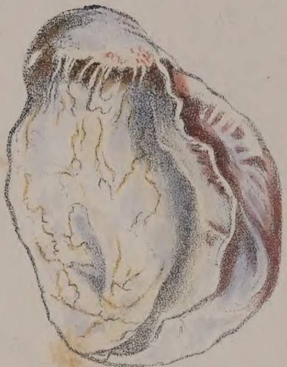

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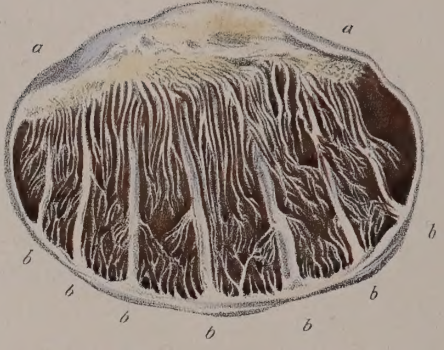
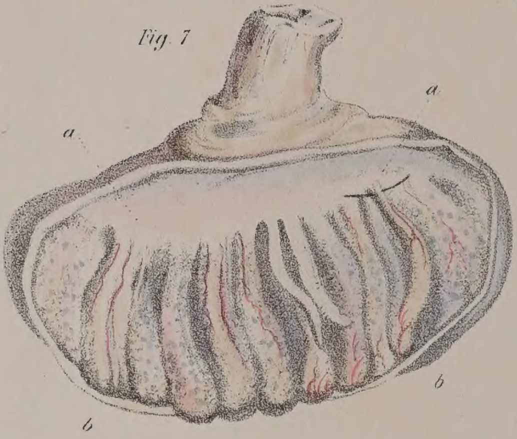


Fig. 7



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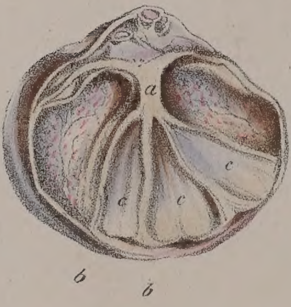
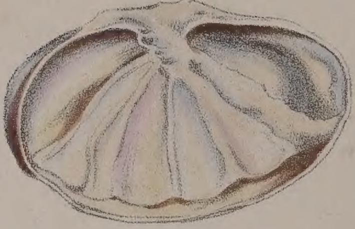


Fig. 9



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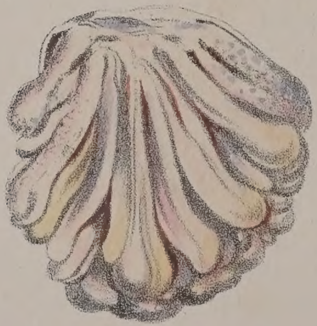

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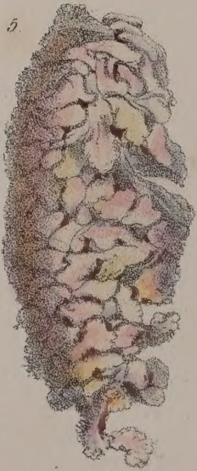

Fig 6

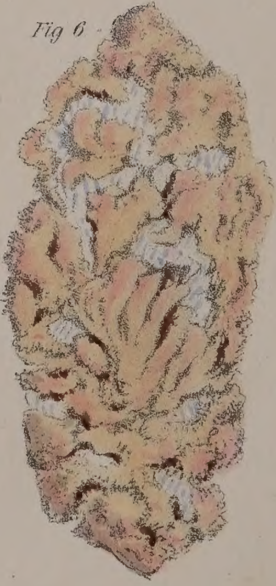

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PLATE II.—PART I.

Fig. 1. shows the external portion of the tunica albuginea cut open, and turned aside, to show the internal vascular layer, with the spermatic artery taking its tortuous course upon it. With care this layer may be entirely dissected from the thicker tendinous coat.

Fig. 2.—The internal layer of the tunica albuginea injected, and the tubuli removed, to exhibit this vascular membrane.

Fig. 3.—The tunica albuginea cut perpendicularly through its centre :—

a a, its process, which I have called the mediastinum.

b b b b b b b, the ligaments which connect the sides of the tunica albuginea, and which form strong bands of union between them, to prevent the injurious effects of violence. Between these pillars are seen ligaments, which are shorter and more delicate, some of which proceed from the mediastinum, and a few from the opposite edge of the testis, from which membranes are extended, to envelope the lobes of the tubuli.

Fig. 4.—The pyriform lobes, into which the tubuli are divided, detached from their envelopes, but connected by their apices to the mediastinum.

Fig. 5.—The bases of the lobes at the anterior edge of the testis unravelled.

PLATE II. CONTINUED.

Fig 6. shows a section of the lobes in the centre of the testis, with the intervening vascular membrane which envelopes them.

Fig. 7.—Perpendicular and longitudinal section of the testis :—

a a, the mediastinum testis.

b b, the lobes of the tubuli attached to the mediastinum, and proceeding to the tunica albuginea, on which the vascular enveloping membrane appears.

Fig. 8.—Perpendicular and transverse section of the testis :—

a, the mediastinum.

b, the connecting ligaments of the tunica albuginea.

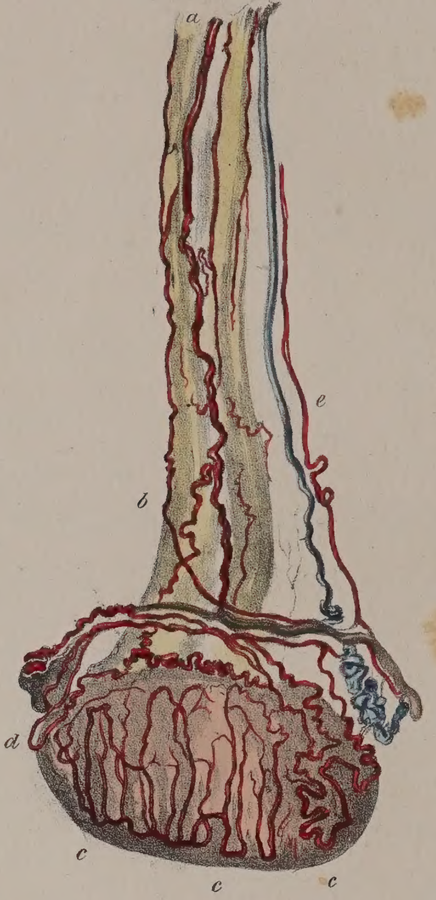
c c c, the vascular membrane enveloping the lobes.

In this view is also seen the tunica albuginea divided into layers, the outer layer passing upon the spermatic cord ; the middle portion forming the mediastinum ; the inner the vascular membrane.

Fig. 9.—A similar section with the former, showing the connecting ligaments or pillars of the tunica albuginea, and more perfectly the enveloping membrane.

PLATE 3.

Fig. 2



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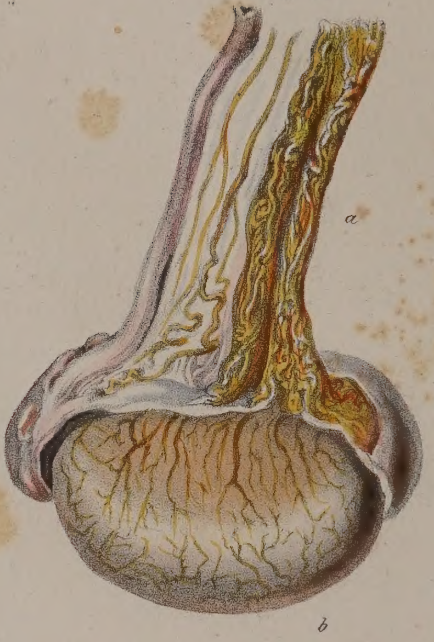

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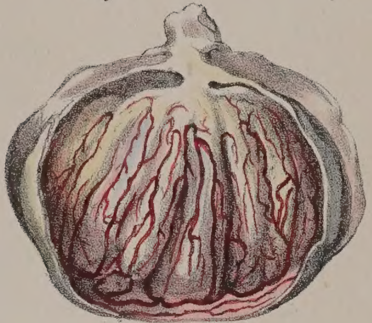

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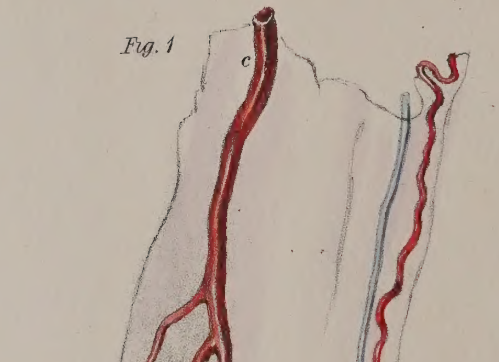

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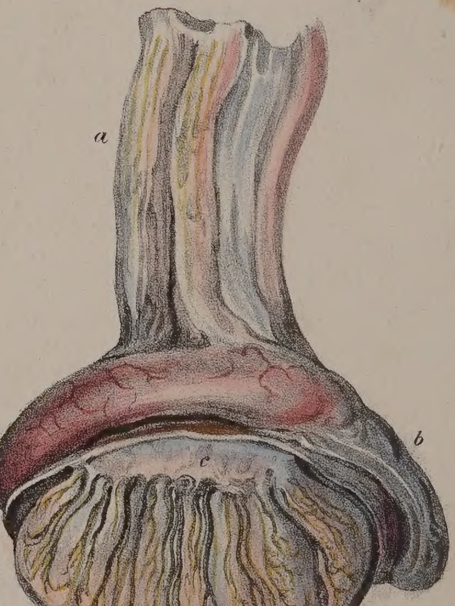

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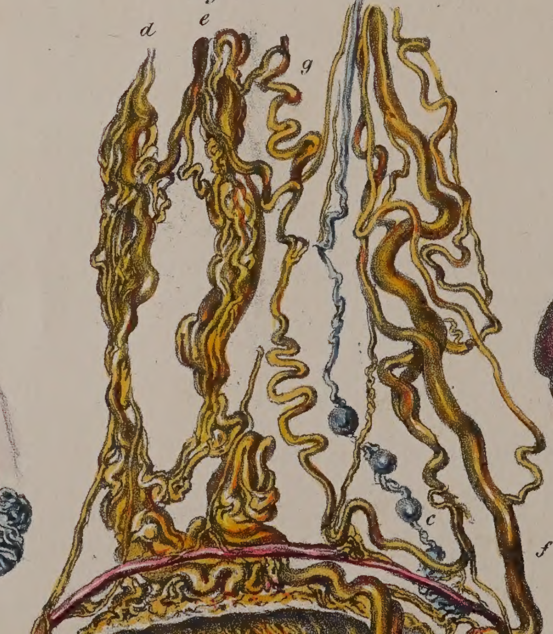

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PLATE III.—PART I.

Fig. 1 shows the deferential artery :—

- *a*, testis.
- *b*, vas deferens.
- *c*, spermatic artery.
- *d d*, artery of the vas deferens communicating with the spermatic artery.

Fig. 2 exhibits the spermatic artery and its minute ramifications ; the vessel was filled with coarse injection :—

- *a*, the spermatic artery sending branches to the cord.
- *b*, arteries of the epididymis.
- *c c c*, spermatic artery in the testis, showing its arches below, and its inverted branches first ascending then descending.
- *d*, another and superior arch in the mediastinum.
- *e*, artery accompanying the vas deferens, arising from a vesical artery of the hypogastric.

Fig. 3.—Section of the testis, to show the vascular membrane of the lobes of the tubuli. The inferior arches of the spermatic artery are seen, and their branches passing up on the vascular membrane, turning and descending again, to supply the lobes.

Fig. 4.—Preparation of the veins :—

- *a*, the veins of the cord.
- *b*, the branches of veins on the vascular membrane of the body of the testis.

PLATE III. CONTINUED.

Fig. 5.—*a*, veins of the spermatic cord.

b, epididymis.

c, mediastinum, in which the rete is situated.

d, section of the testis, to show the mediastinum, and the direction of the internal veins which pass from above downward.

Fig. 6.—Veins of the spermatic cord and testis filled with coarse injection, and unravelled:—

a, testis

b, epididymis.

c, vas deferens, with some curious sacs upon it, three of which are seen.

d, first cluster of veins.

e, second cluster of veins.

f, veins accompanying the vas deferens.

g g, communicating veins between *d*, *e*, and *f*. Several veins are seen springing from the epididymis.

PLATE 4

Fig. 4

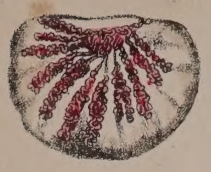


Fig. 3

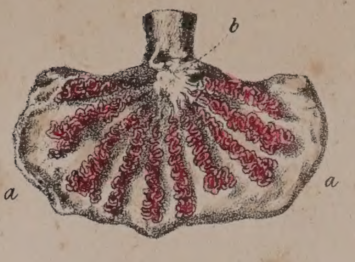
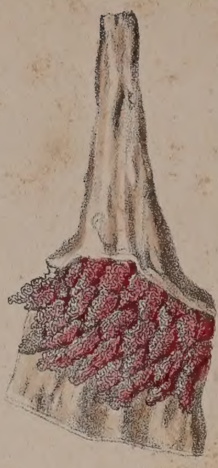


Fig. 1



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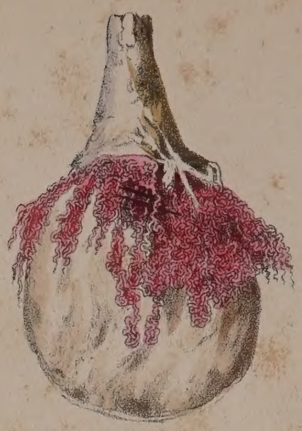

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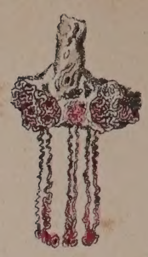

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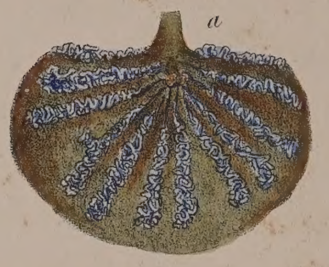

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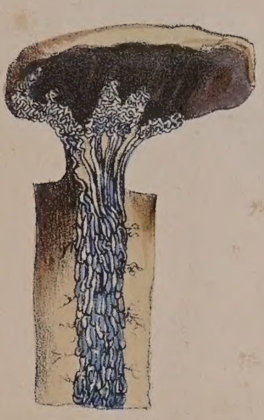

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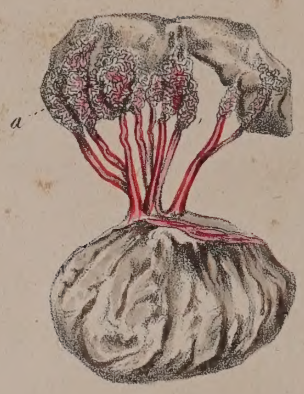

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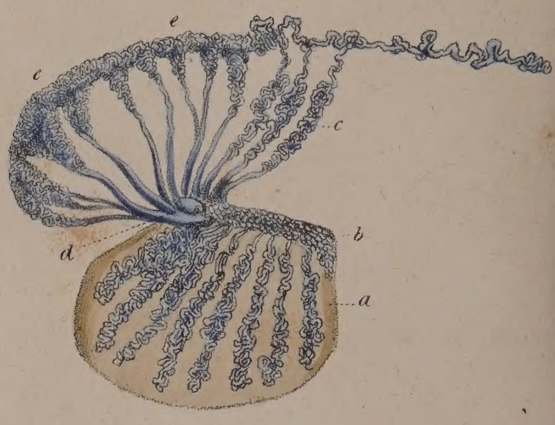

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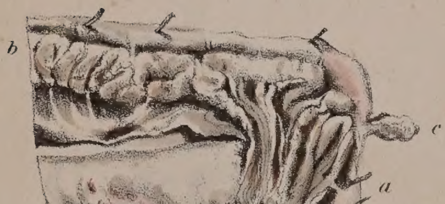

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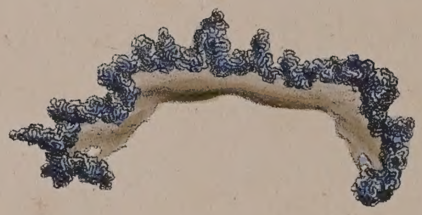

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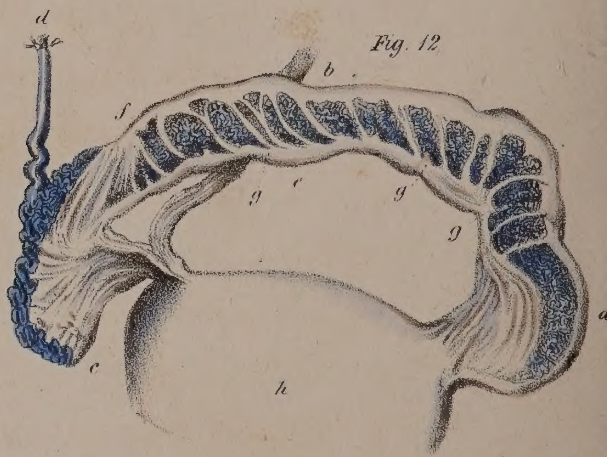

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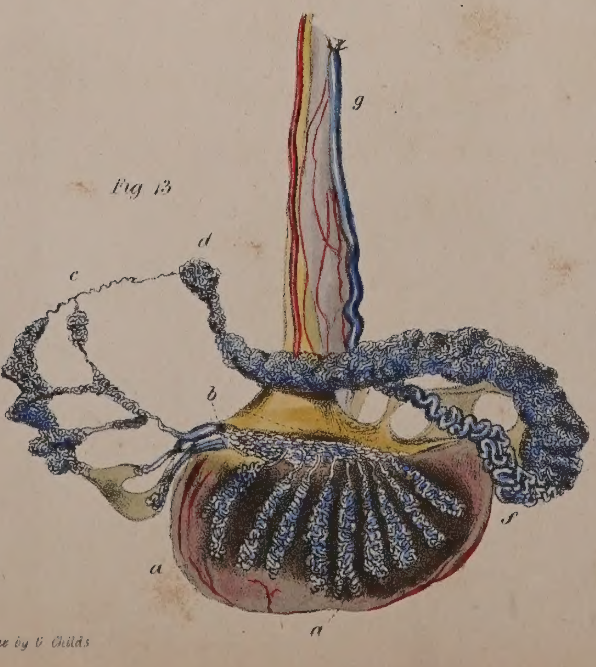

Fig. 14

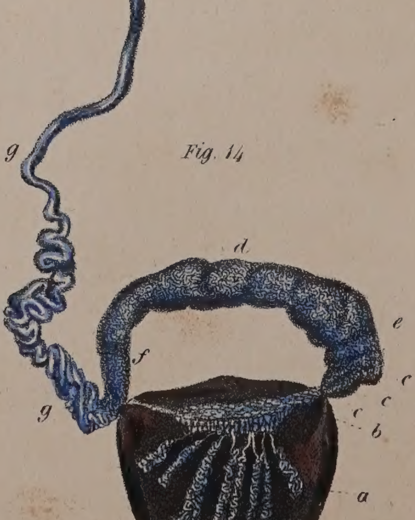

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PLATE IV.—PART I.

Shows the seminiferous structure of the testis and epididymis.

Fig. 1.—The lobes of the tubuli injected with coloured glue.

Fig. 2.—The tubuli injected with coloured glue, and in part unravelled.

Fig. 3.—Tubuli injected :—
aa, tubuli ; *b*, rete.

Fig. 4.—Another similar section, showing the rete and tubuli.

Fig. 5.—Tubuli injected with red glue, and unravelled.

Fig. 6.—Tubuli injected with quicksilver :—
a, mediastinum and holes of the rete.

Fig. 7.—Preparation of the rete and vasa efferentia, injected with quicksilver.

Fig. 8.—Vasa efferentia injected with coloured glue :—
a, their lobes.

Fig. 9.—*a*, tubuli ; *b*, rete ; *c*, vasa efferentia terminating in the epididymis ; *d*, a little sac upon the vasa efferentia, often found ; *e e*, epididymis ; *f*, epididymis unravelled.

Fig. 10.—*a*, vasa efferentia ; *b*, lobes of the epididymis ; *c*, a little membranous body at the end of the epididymis, appearing like the ending of the membrane which covers it.

Fig. 11 shows the lobes of the epididymis.

PLATE IV. CONTINUED.

Fig. 12.—Epididymis :—

a, caput ; *b*, body ; *c*, cauda ; *d*, vas deferens ; *e*, membranous bands at the lower arch ; *ff*, membrane at its upper arch ; *g g g*, ligaments supporting and dividing the lobes ; *h*, testis.

Fig. 13 shows the whole seminiferous structure injected, and in part unravelled :—

a a, tubuli ; *b*, rete ; *c c*, vasa efferentia ; *d*, vasa efferentia ; *e*, cauda epididymis ; *f*, beginning of the vas deferens ; *g*, vas deferens.

Fig. 14 shows the whole structure injected with quicksilver :—

a, tubuli ; *b*, rete ; *c c c*, vasa efferentia ; *d*, body of the epididymis ; *e*, caput epididymis ; *f*, cauda epididymis ; *g*, vas deferens.

The tubes through which the semen passes are the tubuli, the rete, vasa efferentia, epididymis, and vas deferens.

PLATE 5

Fig. 2

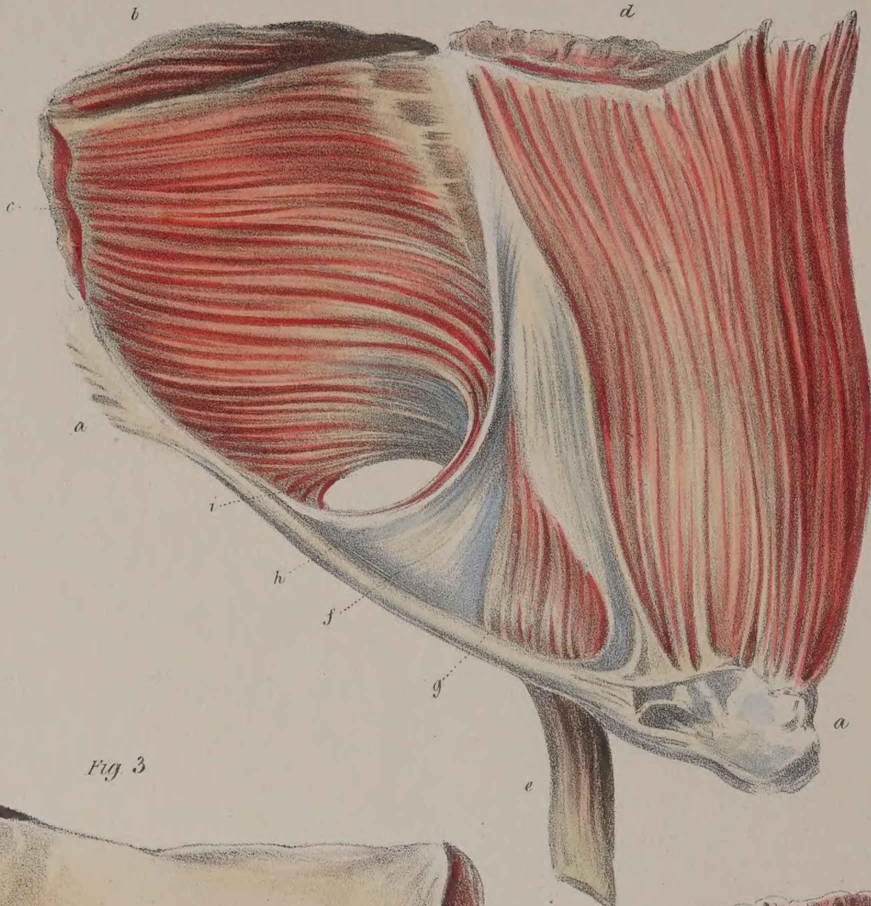

Fig. 3

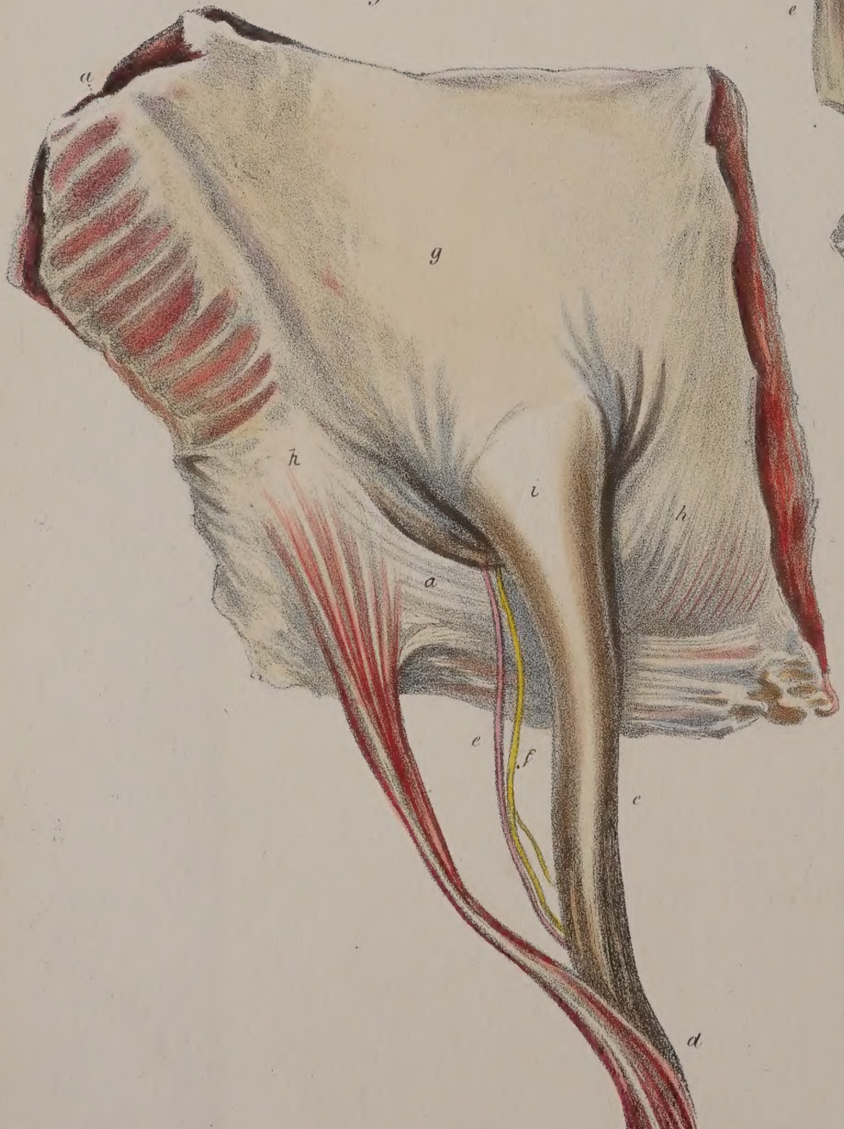

Fig. 1

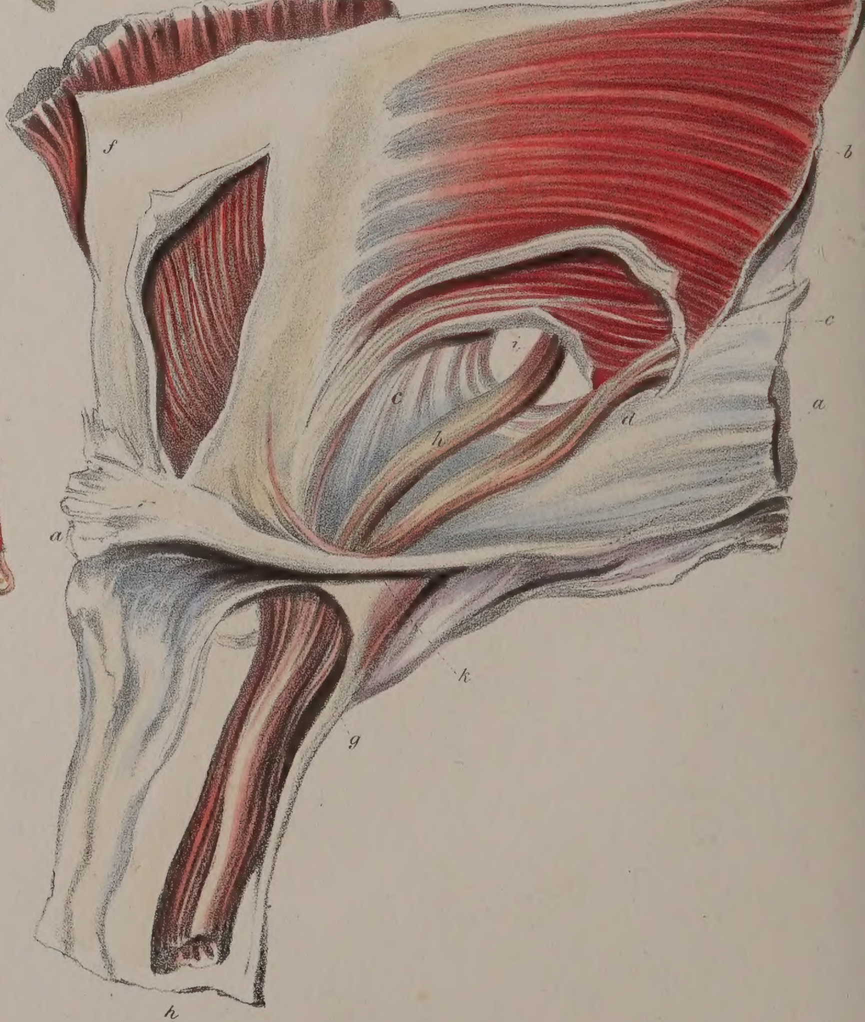

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PLATE V.—PART I.

Showing the inguinal canal and course of the spermatic cord.

Fig. 1.—The inguinal canal opened :—

a a, Poupart's ligament.
b, internal oblique muscle.
c c, transversalis muscle arising from Poupart's ligament, and passing around the spermatic cord at the internal ring, so that the fibres of this muscle appear behind as well as before the spermatic cord, and thus the inguinal canal is rendered a muscular canal.*
d, the cremaster muscle, arising from Poupart's ligament, between the internal oblique and transverse muscles, and receiving fibres from the transversalis behind the cord.
e, rectus muscle.
f, its sheath from the internal oblique and transverse muscles.
g, superficial fascia of the cord.
h h, spermatic cord.
i, internal ring.
k, external ring.

Fig. 2.—Internal view of the inguinal canal :—

a a, Poupart's ligament.
b, internal oblique muscle.
c, transversalis muscle.

---

* This is a most important provision in preventing hernia ; and when hernia exists, it is often the cause and seat of stricture.

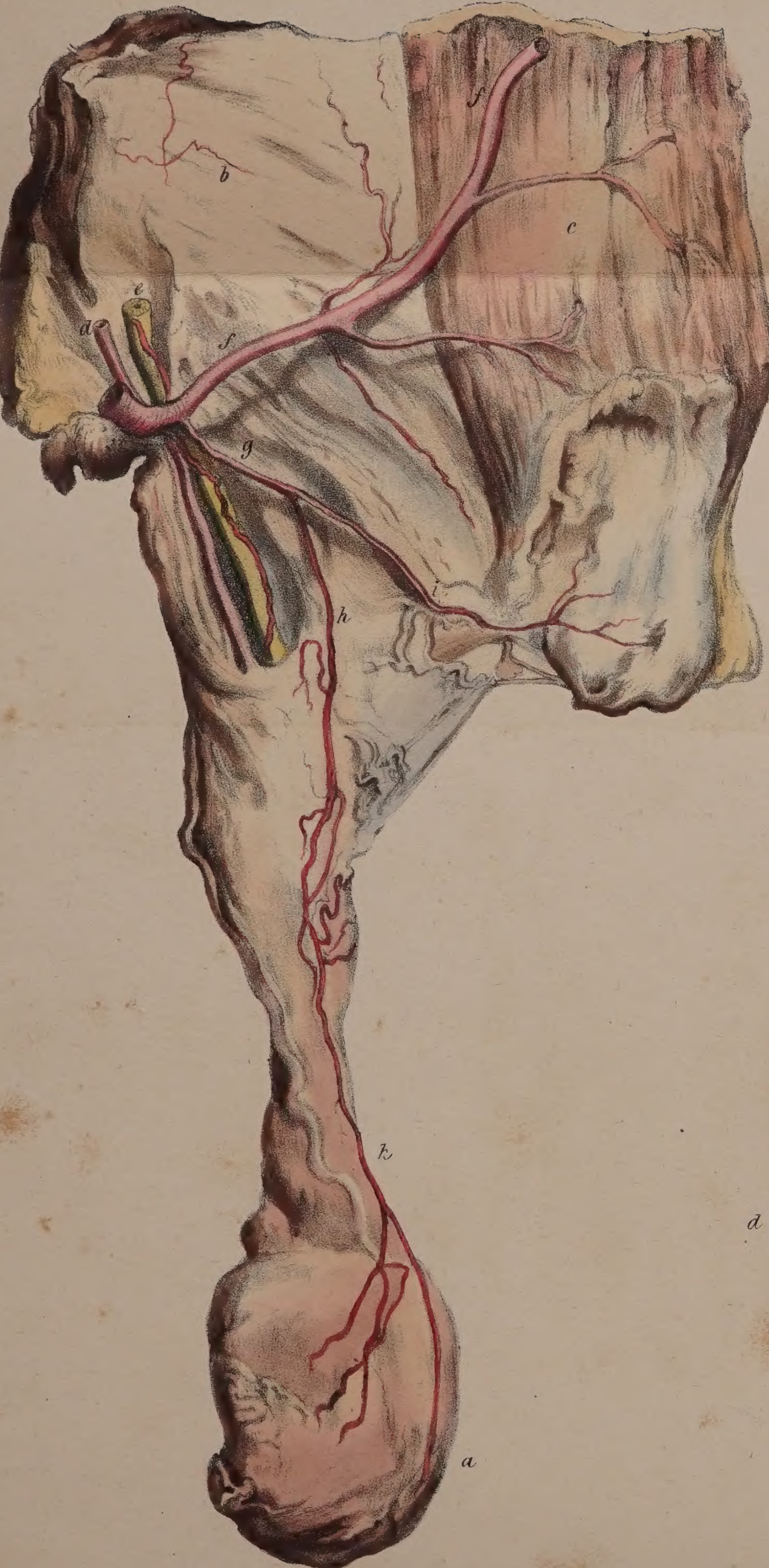
d, rectus muscle.
e, spermatic cord below the external ring.
f, internal portion of the fascia transversalis with the transversalis muscle passing upon it, to be fixed in Poupart's ligament.
g, muscular fibres seen through the fascia.
h, fascia transversalis, and transversalis muscle, forming the inner portion of the inguinal canal, above which is seen the linea semilunaris.
i, the origin of the transversalis muscle from Poupart's ligament, and the manner in which it is twisted round upon the fascia transversalis, to be inserted into it and into Poupart's ligament.

Fig. 3 shows the fascia transversalis united to the spermatic cord in its passage :—

a a, Poupart's ligament.
b, cremaster muscle arising from it.
c, spermatic cord below the external ring.
d, cremaster passing upon the cord.
e and *f*, artery and vein from the epigastric to the cremaster muscle—cremasteric artery.
g, external portion of the fascia transversalis.
h, internal portion of the fascia transversalis covered by muscular fibres from the transversalis.
i, the cord united by a thin layer to the fascia transversalis.

PLATE 6

Fig. 3



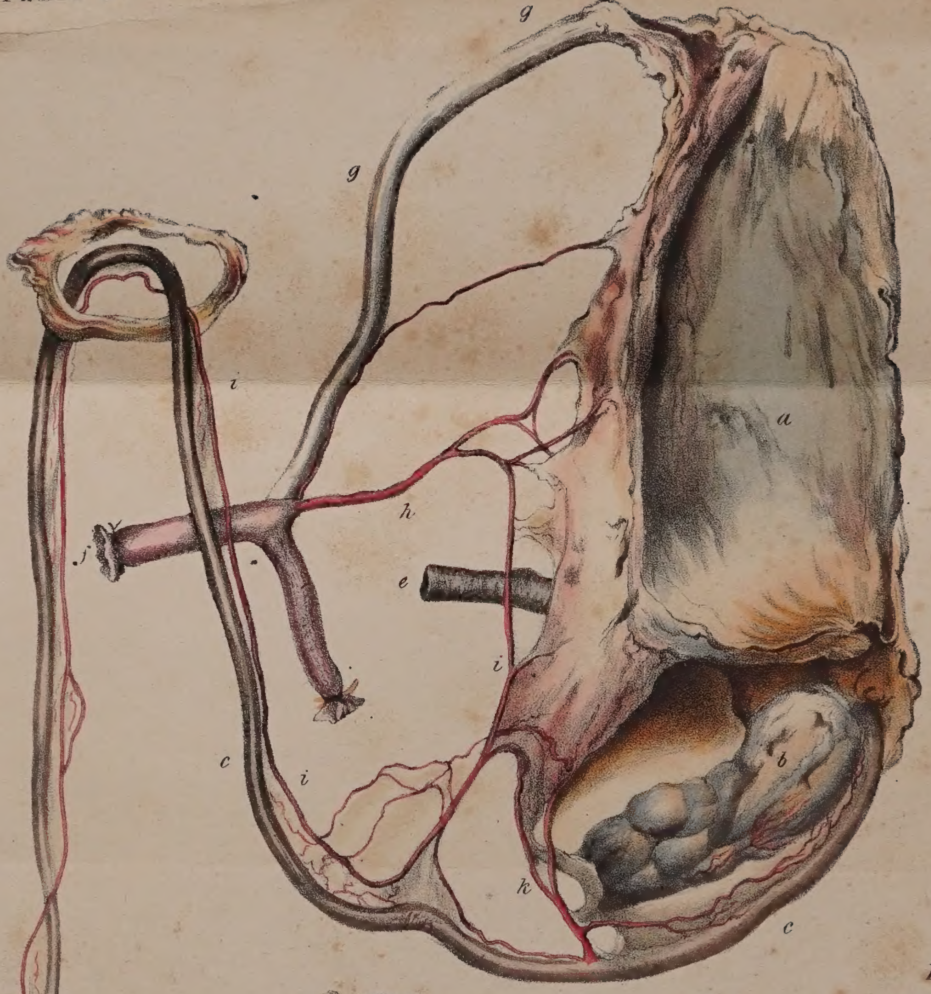


Fig. 2

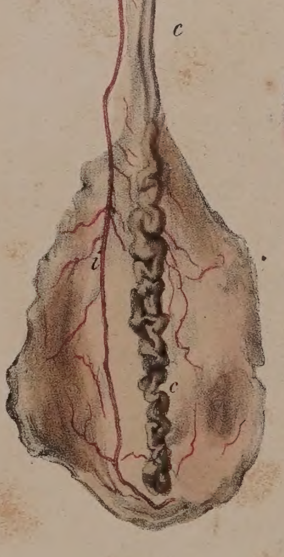


Fig. 1.

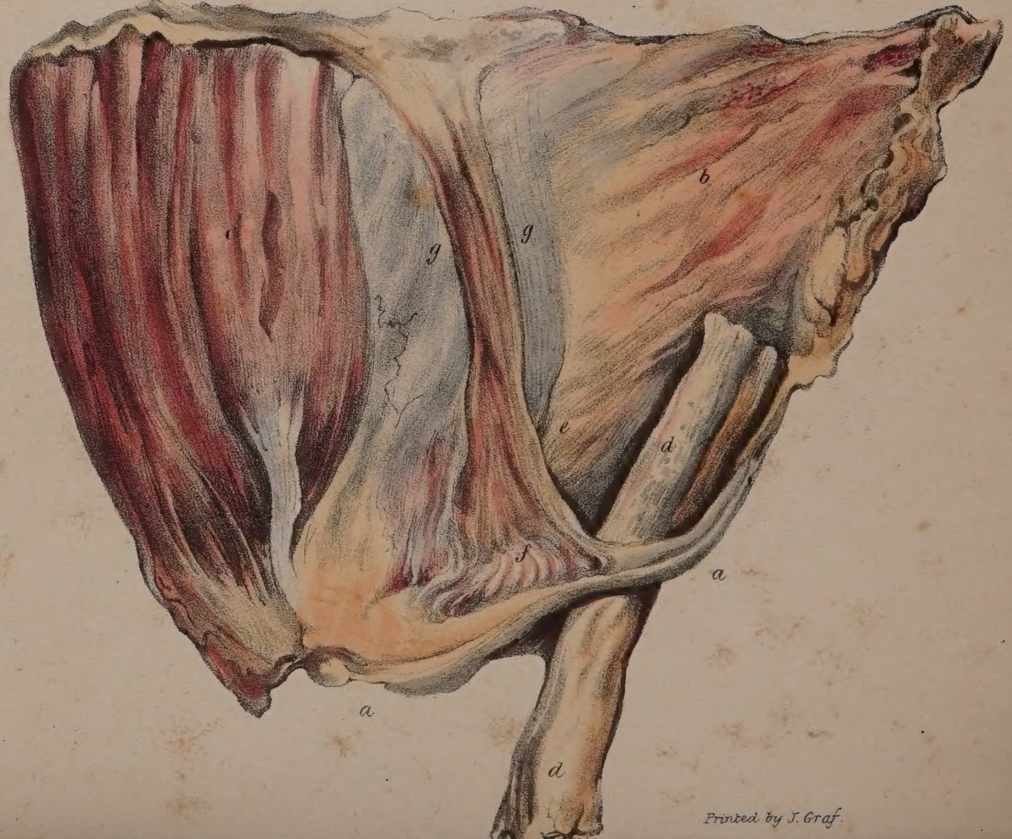


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PLATE VI.—PART I.

Exhibits, first, an internal view of the inguinal canal—Secondly, the origin and course of the artery of the vas deferens—Thirdly, the course of the cremasteric artery.

Fig. 1.—*a a*, Poupart's ligament.
b, transversalis muscle.
c, rectus.
d d, spermatic cord.
e, inguinal canal.
f, fascia transversalis.
g g, muscular fibres from the linea semilunaris inserted into the fascia transversalis.*

Fig. 2.—The course of the deferential artery :—
a, bladder.
b, vesicula seminalis.
c c c c, vas deferens.
d, testis.
e, ureter.
f, hypogastric artery.
g g, remains of the umbilical artery.
h, vesical artery.

---

* Muscular fibres are always found proceeding from the transversalis muscle, upon that part of the fascia transversalis which forms the posterior surface of the inguinal canal ; but a distinct portion of muscle from the linea semilunaris only occasionally exists.

i i i, artery of the vas deferens, or deferential artery.

k, descending branch of it to the vesicula seminalis.

Fig. 3.—The course of the cremasteric artery :—

a, testis.

b, transversalis muscle.

c, rectus abdominis.

d, spermatic artery.

e, vas deferens.

f f, epigastric artery.

g, artery from the epigastric.

h h, cremasteric branch.

i, branch to the rectus and pyramidalis muscles.

PLATE 7.

Fig. 1.

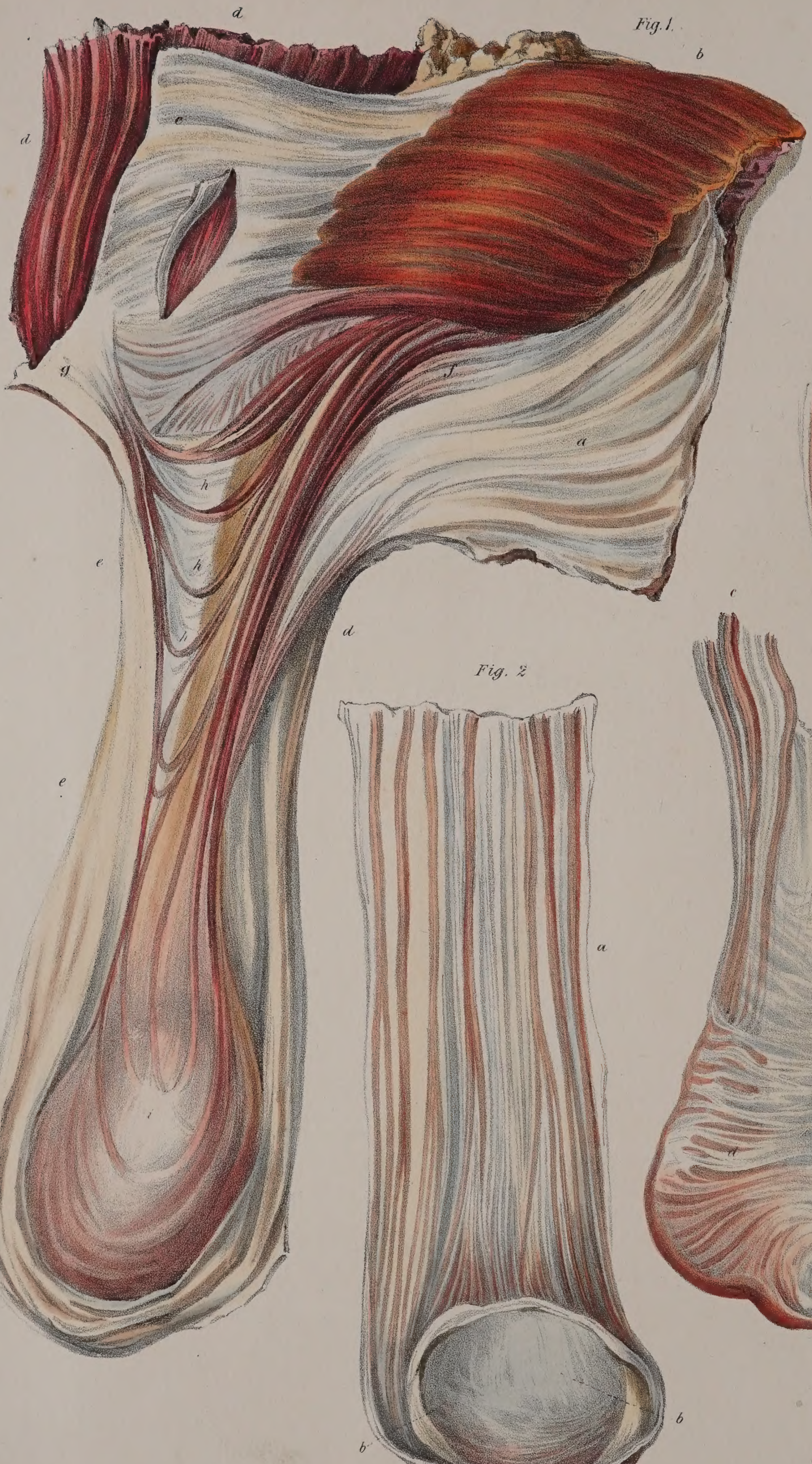

Fig. 2

Fig. 3.

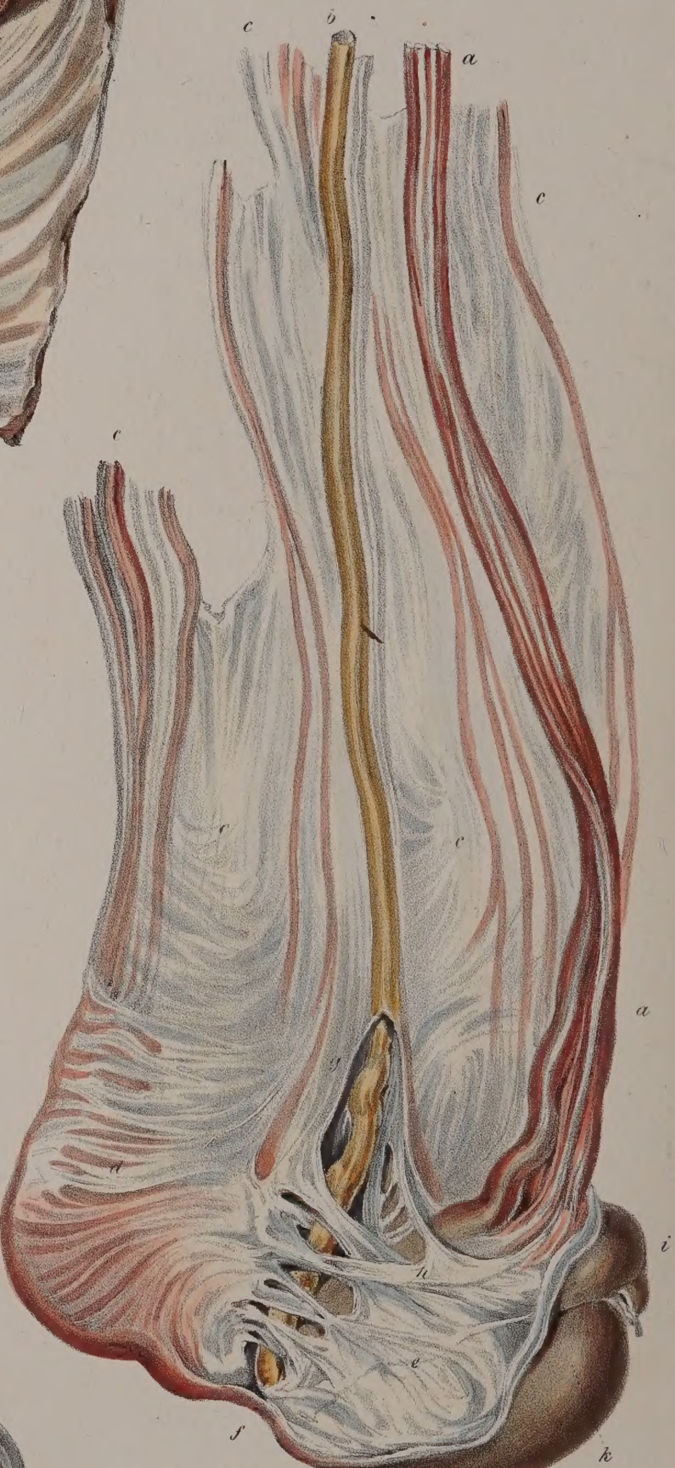

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PLATE VII.—PART I.

Exhibits the origin, course, and insertion of the cremaster muscle.

Fig. 1.—*a*, tendon of the external oblique muscle.
b, internal oblique.
c, its tendinous sheath on the rectus.
d, rectus muscle.
e, superficial fascia of the spermatic cord.
f, origin of the cremaster muscle from Poupart's ligament, and from between the internal oblique and transversalis muscles, with which it blends.
g, its attachment to the sheath of the rectus.
h h h, the loops which are brought down by the descent of the testis into the cremaster.
i, testis, and the insertion of the cremaster.

Fig. 2.—The tendinous sling formed by the cremaster to cover the testis :—

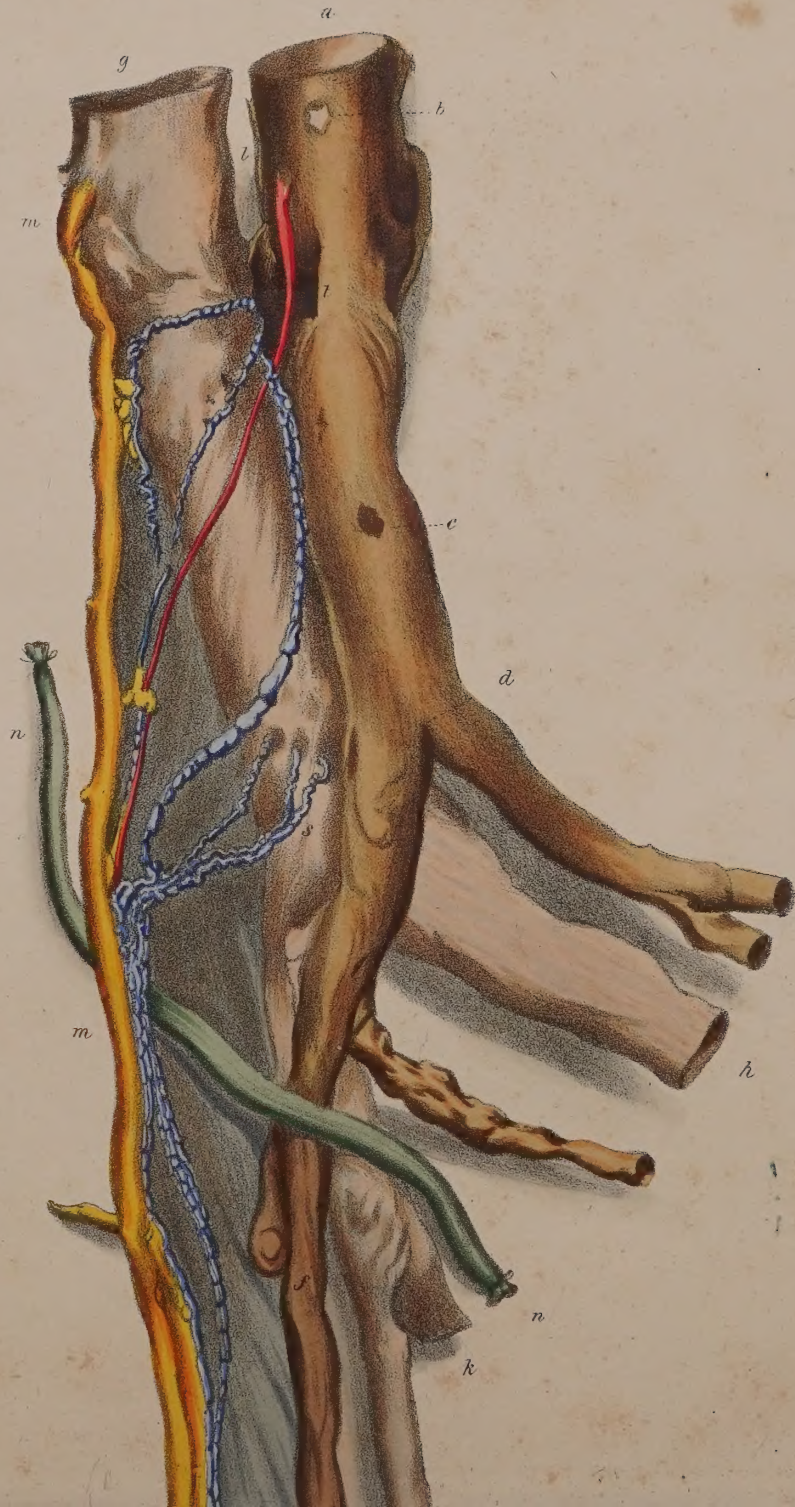
a, fibres of the cremaster enveloping the spermatic cord.
b, *b*, the sling formed by the cremaster upon the tunica vaginalis.

Plate VII. continued.

Fig. 3.—The insertions of the cremaster muscle :—

a, *a*, spermatic vessels.
b, vas deferens.
c c c c, different portions of the cremaster.
d, its sling turned back from the testis.
e, its tendinous insertions into the tunica vaginalis.
f, its insertions into the back-part of the testis.
g, sheath which it forms on the vas deferens, and cords or ligaments of the vas deferens passing from convolution to convolution, to support and preserve them.
h, insertion of the cremaster into the epididymis.
i, epididymis.
k, testis.

PLATE 8.



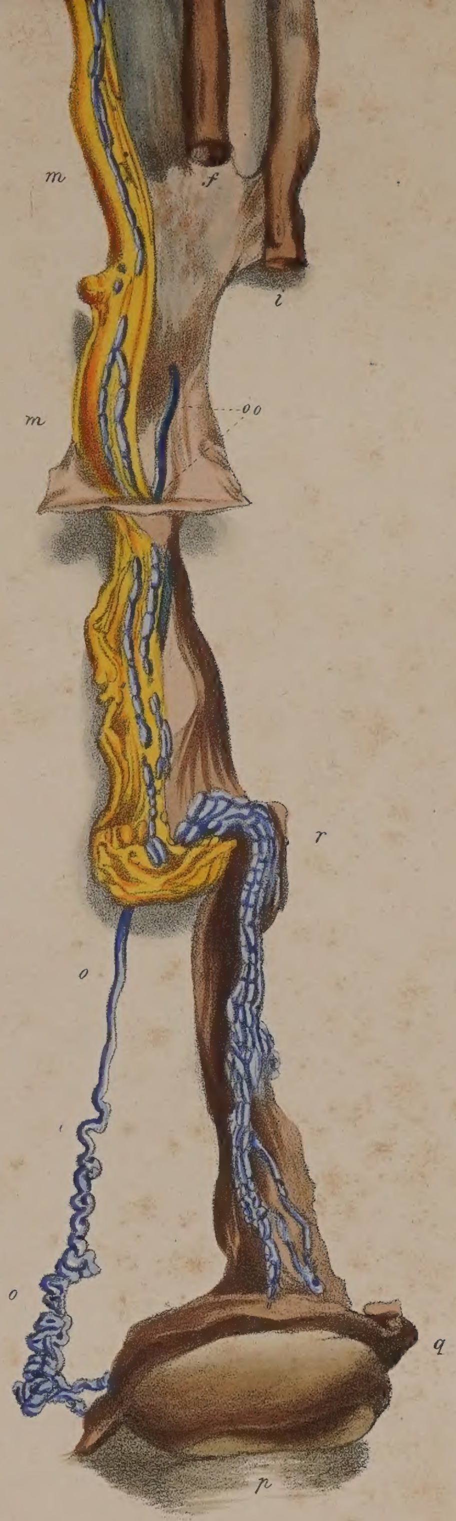


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PLATE VIII.—PART I.

Shows the course of the absorbent vessels of the testis accompanying the spermatic cord into the abdomen, and terminating in the absorbent glands of the loins, from which other absorbent vessels spring, to terminate in the thoracic duct.

a, aorta.
b, superior mesenteric artery.
c, inferior mesenteric artery.
d, bifurcation of the aorta.
e, external iliac artery.
f, internal iliac artery.
g, inferior cava.
h, left iliac vein.
i, right external iliac vein.
k, internal iliac vein.
l, spermatic artery.
m m m m, spermatic vein.
n n, ureter crossing the bifurcation of the iliac vessels.
o o o, vas deferens ; *o o*, passing through the internal abdominal ring.
p, testis.
q, epididymis.
r r, absorbent vessels.
s, absorbents terminating in glands on the inferior cava.
t, an absorbent gland placed below the spermatic artery, receiving some large absorbent vessels : it is to these glands, *s* and *t*, that diseases of the testis extend.

PLATE 9

Fig. 2

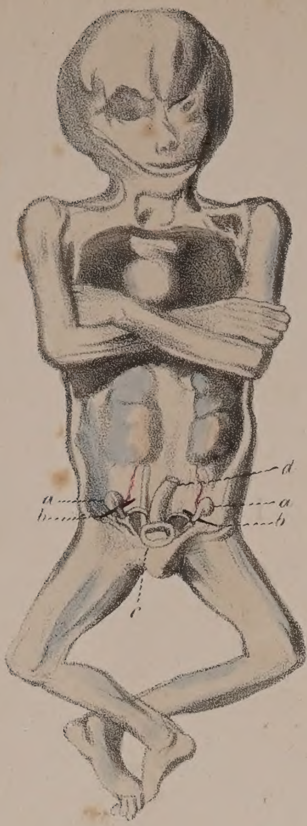


Fig. 4

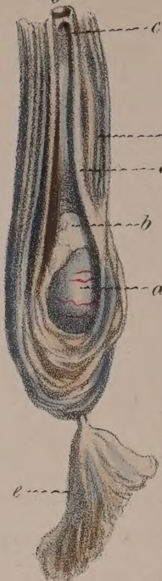


Fig. 6

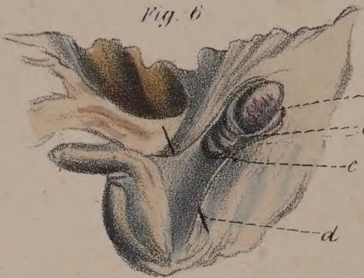


Fig. 5.

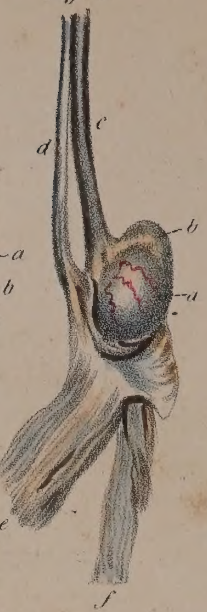
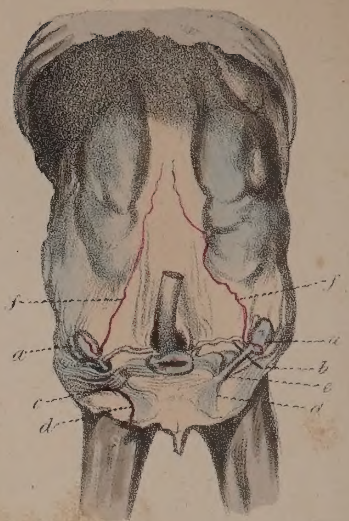


Fig. 3



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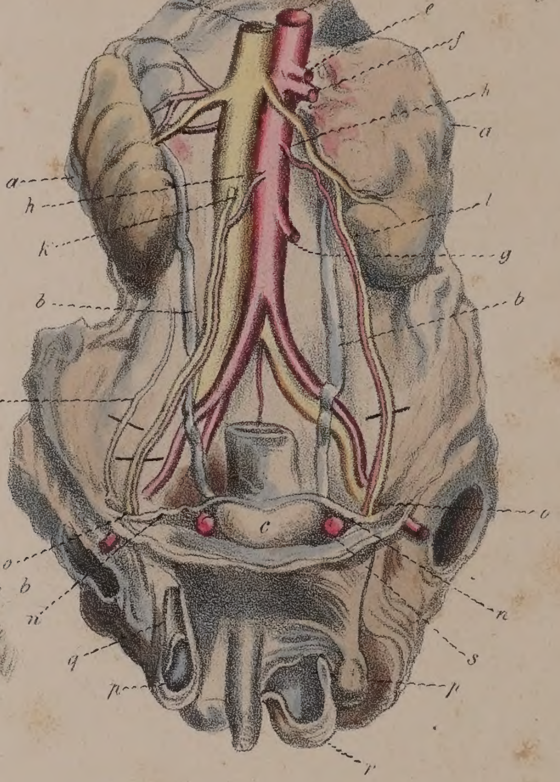

Fig. 10

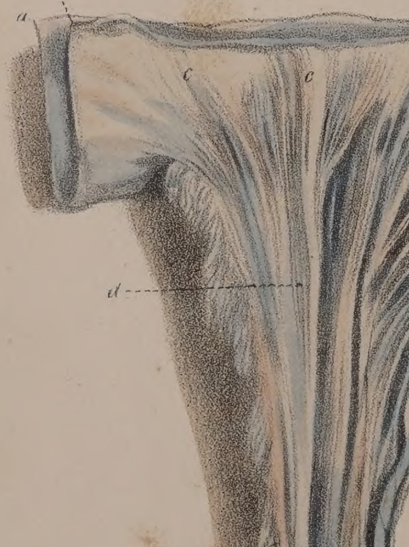

Fig. 11

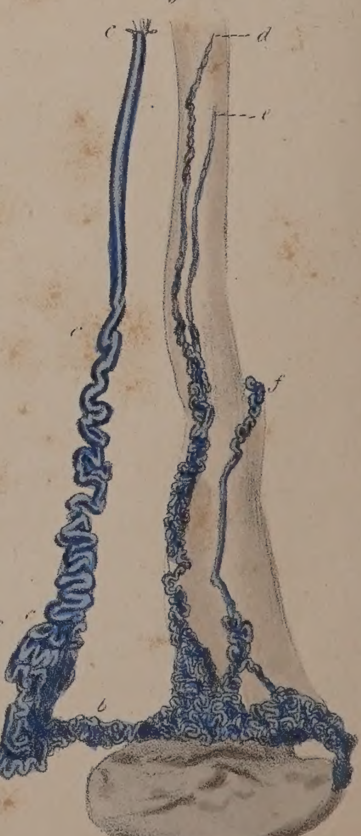

Fig. 7

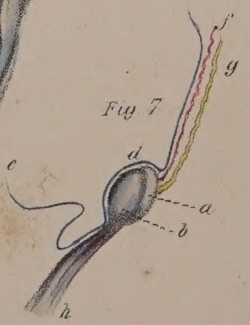

Fig. 9

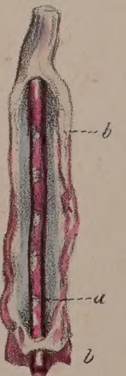

Fig. 8

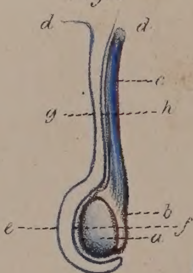

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PLATE IX.—PART I.

Fig. 1.—View of the fœtal testis recently descended, the tunica vaginalis still remaining open :—

a a, kidneys ; *b*, ureters ; *c*, bladder ; *d*, aorta ; *e*, cæliac artery ; *f*, superior mesenteric ; *g*, inferior mesenteric artery ; *h h*, spermatic arteries ; *i*, inferior cava ; *k*, right spermatic vein ; *l*, left spermatic vein ending in the left emulgent vein ; *m*, external spermatic nerve ; *n n*, vasa deferentia ; *o o*, orifice of the tunica vaginalis ; *p p*, testes ; *q*, tunica vaginalis of the spermatic cord ; *r*, the scrotum ; *s*, the umbilical artery.

Fig. 2 shows the testis in the abdomen :—

a a, testes ; *b b*, gubernacula ; *c*, bladder ; *d*, rectum.

Fig. 3.—Testes in the abdomen :—

a a, testes ; *b*, gubernaculum on the left side ; *c*, pouch of peritoneum in the inguinal canal, covered by the abdominal muscles and cremaster, into which latter the testis descends ; *d d*, fan-like termination of the gubernaculum at this period ; *e*, pouch of peritoneum in the inguinal canal cut open ; *f f*, spermatic arteries.

Fig. 4.—Descended testis :—

a, testis ; *b*, epididymis ; *c*, tunica vaginalis of the cord and testis ; *d*, cremaster ; *e*, gubernaculum.

Fig. 5.—The cremaster stripped from the cord, to show its insertions :—

a, testis ; *b*, epididymis ; *c*, spermatic artery and vein ; *d*, vas deferens ; *e*, cremaster inserted into the tunica vaginalis, vas deferens, testis, and epididymis ; *f*, gubernaculum.

Fig. 6 shows the testis passing the inguinal canal :—

a, testis ; *b*, epididymis ; *c*, tunica vaginalis ; *d*, gubernaculum attached to the scrotum.

Fig. 7.—A diagram of the undescended testis:—

a, testis; *b*, epididymis; *cc*, peritoneum; *d*, tunica vaginalis testis, or peritoneum covering the tunica albuginea; *e*, pouch of peritoneum attached to the gubernaculum, descending with the testis, and becoming the tunica vaginalis reflexa; *f*, spermatic artery behind the peritoneum; *g*, spermatic vein; *h*, gubernaculum.

Fig. 8.—A diagram of a descended testis:—

a, testis; *b*, epididymis; *c*, spermatic vessels; *d d*, peritoneum descending to form the tunica vaginalis; *e*, tunica vaginalis reflexa; *f*, tunica vaginalis testis; *g*, tunica vaginalis reflexa of the cord; *h*, tunica vaginalis of the cord.

Fig. 9.—Sheath of the spermatic artery, to preserve its serpentine direction:—

a, the artery; *bb*, the sheath, which becomes stronger as it descends towards the testis.

Fig. 10.—Ligamentous cords, and a thin fascia, which proceed from the peritoneum and internal ring upon the vas deferens and spermatic artery and vein, so as to form a thin but distinct sheath to the spermatic cord under the cremaster muscle.

a a, peritoneum; *b b*, vas deferens; *c c c c*, ligaments of the vas deferens from the peritoneum; *d d d d*, ligaments of the vas deferens and spermatic cord from the peritoneum and internal ring.

I may here observe that the examination of the structures depicted in Figs. 9 & 10 should be conducted under water, as should be indeed all the minute dissections of this organ.

Fig. 11 shows the existence of three vasa deferentia cæca, beside the usual vas deferens:—

a, testis; *b*, epididymis; *c c c*, vas deferens; *d*, *e*, *f*, the three superfluous vessels.

PLATE 10

Fig. 1

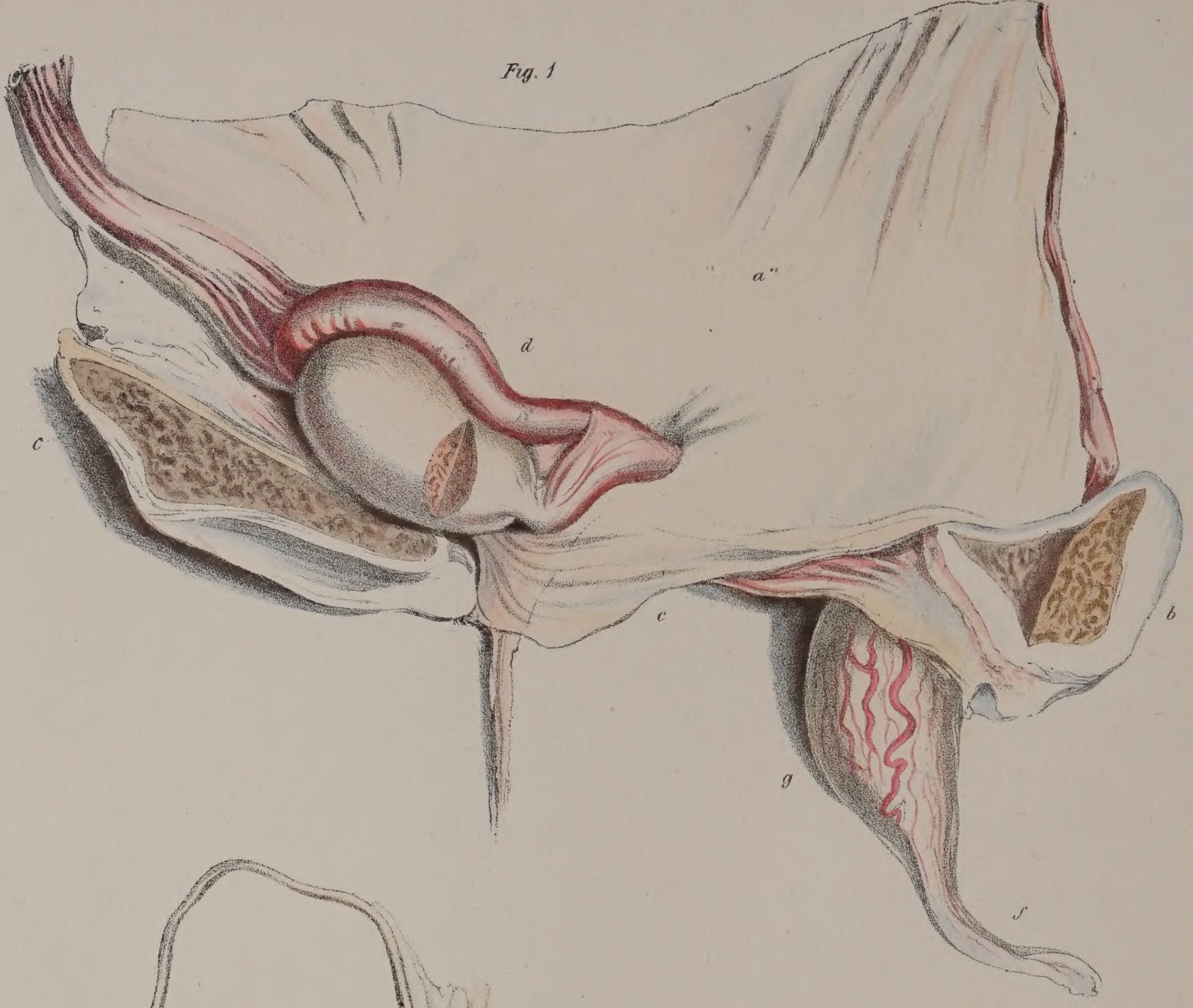

Fig. 2

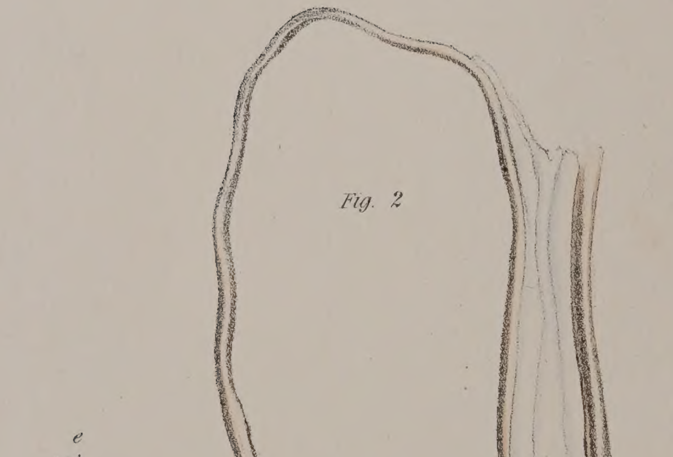

Fig. 3

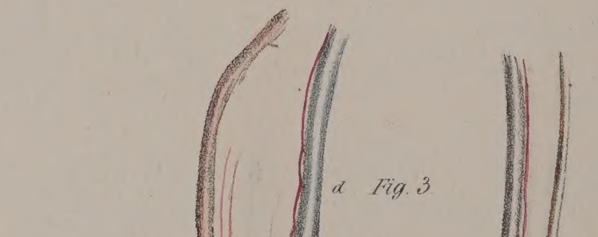

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PLATE X.—PART I.

Contains figures of an undescended testis in the adult, and a wasted testicle. It also exhibits the result of an experiment made upon a dog, of dividing the spermatic artery and vein upon one side, and the vas deferens upon the other.

Fig. 1.—*a*, peritoneum lining the abdominal muscles.
b, pubes.
c, ilium.
d, testis and epididymis.
e, gubernaculum at the inner ring.
f, gubernaculum passing through the external ring.
g, pouch of peritoneum protruding through the external ring, which precedes the descent of the testis.—From the Collection at Guy's Hospital.

Fig. 2.—A wasted testis in the adult:—
a, testis.
b, epididymis.
c, vas deferens.
d, vesicular seminalis.
e, right vas deferens.
f, right vesicula.
g, prostate gland.
h, veru montanum with its two openings—two bristles in the one, and one in the other.

PLATE X. CONTINUED.

Fig. 3.—Experiment on a dog, of dividing the vas deferens on one side, and the spermatic artery and vein on the other :—

a, testis.
b, epididymis.
c, spermatic vessels.
d, vas deferens above the division.
e, vas deferens below the division, and distended with semen.
f, division and non-union of tube.
g, remains of testis, which sloughed from the division of the spermatic artery and vein.
h, the spermatic cord above the division.

PLATE 1.

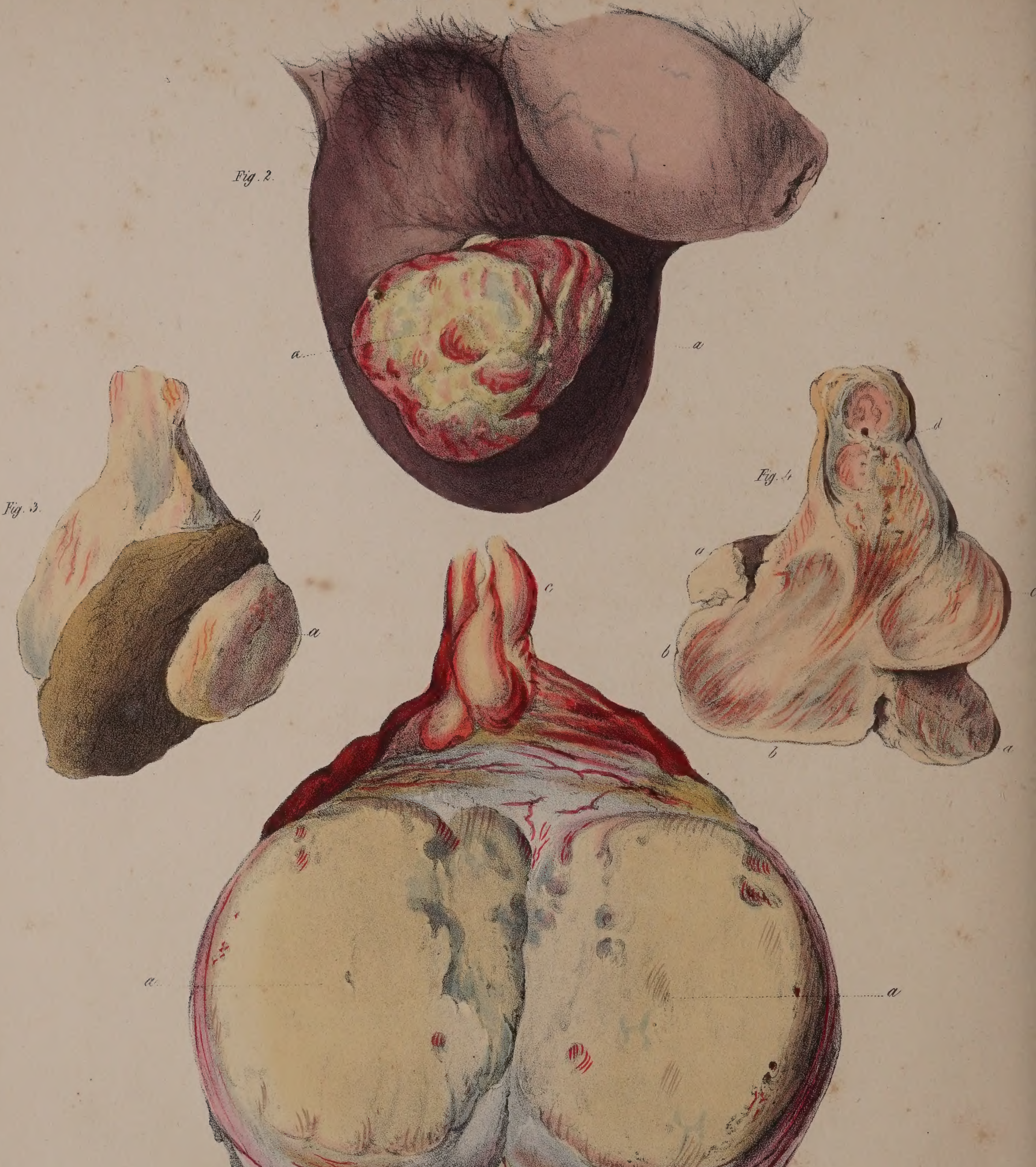

Fig. 1.

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PLATE I.--PART II.

DIFFERENT VIEWS OF THE CHRONIC ENLARGEMENT OF THE TESTIS.

Fig. 1.—Testis of a German gentleman, who had a chronic enlargement of the testis with scarcely any pain.

a a, testis.

b, cauda epididymis.

c, spermatic cord.

The yellow and solid effusion poured out not only into the tubuli, but also into the tissues between them.

Fig. 2 shows the granular swelling of the testis, which frequently succeeds the chronic abscess. This disease is free from all malignant disposition.

a a, granular swelling.

Fig. 3.—A testis removed for a granular swelling :—

a, granular swelling.

b, the skin.

Fig. 4.—Section of a granular swelling :—

a a, skin.

b b, granular swelling.

c, epididymis.

d, spermatic cord.

Transferred to the Museum at St. Thomas's Hospital.

PLATE 2.

Fig 1.

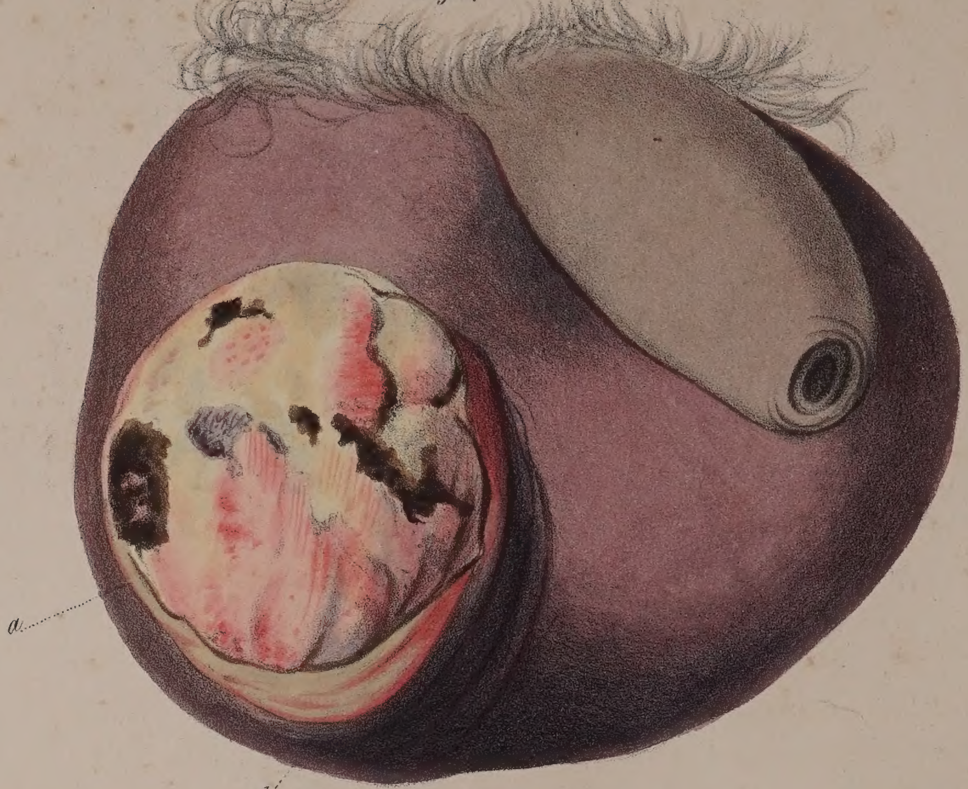
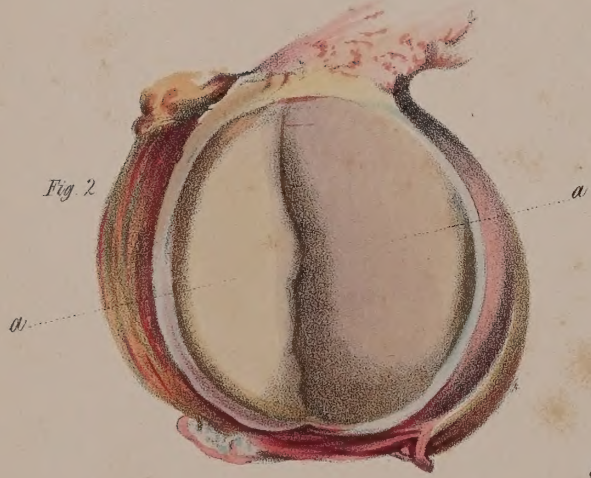


Fig. 2



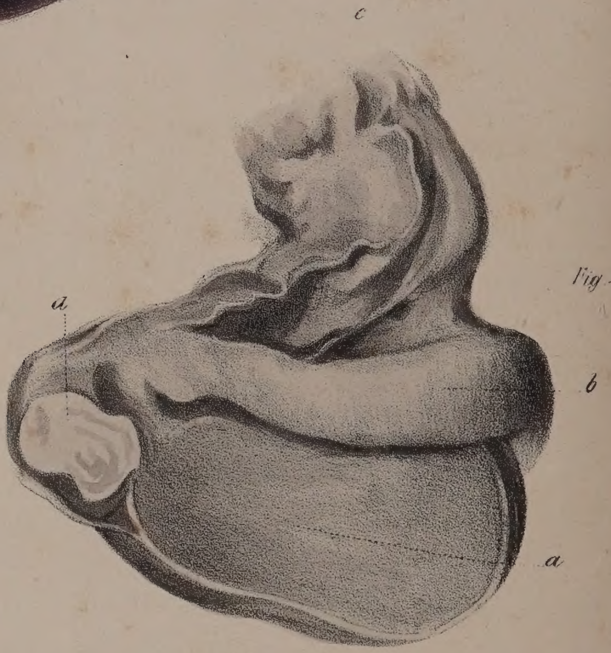


Fig 4

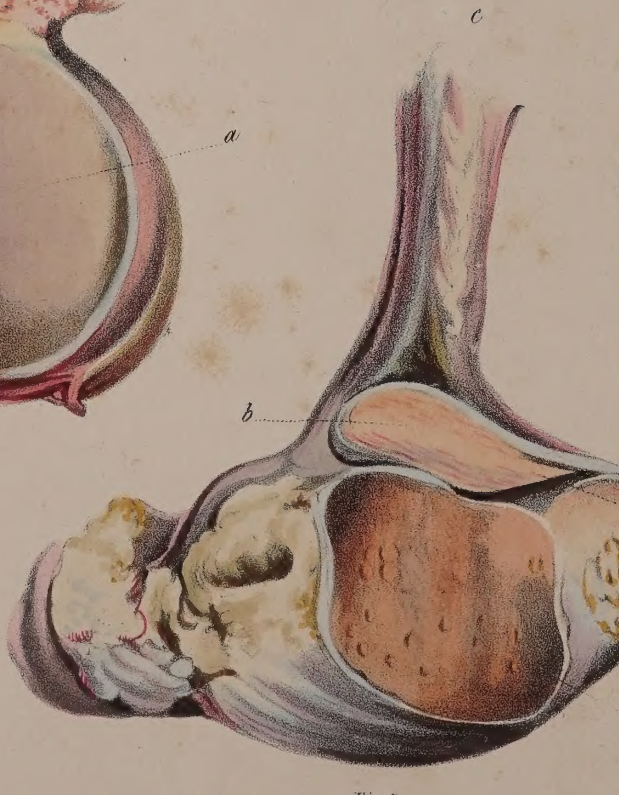


Fig 3

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PLATE II.—PART II.

VIEWS OF CHRONIC AND SCROFULOUS INFLAMMATION OF THE TESTIS.

Fig. 1.—A granular swelling following a chronic abscess in the testis, the granulations protruding through an aperture in the tunica albuginea:—

a, granular swelling.
b, circle of skin at its root.

Fig. 2.—Chronic tumour of the epididymis, removed March 23, 1823, leaving the residue of the epididymis and testis. It had existed nine months; but in the last three months had increased rapidly. The patient was alive and well in 1829.

a a, tumour cut open. It is the caput epididymis enlarged.

Fig. 3.—Scrofulous suppuration of the epididymis, and scrofulous tubercles in the testis.—Removed from a patient of Mr. Brougham, in Finsbury Square. The patient died soon after.

a, testis.
b b, epididymis.
c, spermatic cord.

Fig. 4.—Earthy matter effused in the epididymis by chronic inflammation:—

a, testis.
b, epididymis.
c, cord.
d, earthy deposit.

In St. Thomas's Hospital, excepting Fig. 2 *and* 3.

PLATE 3

Fig 1.

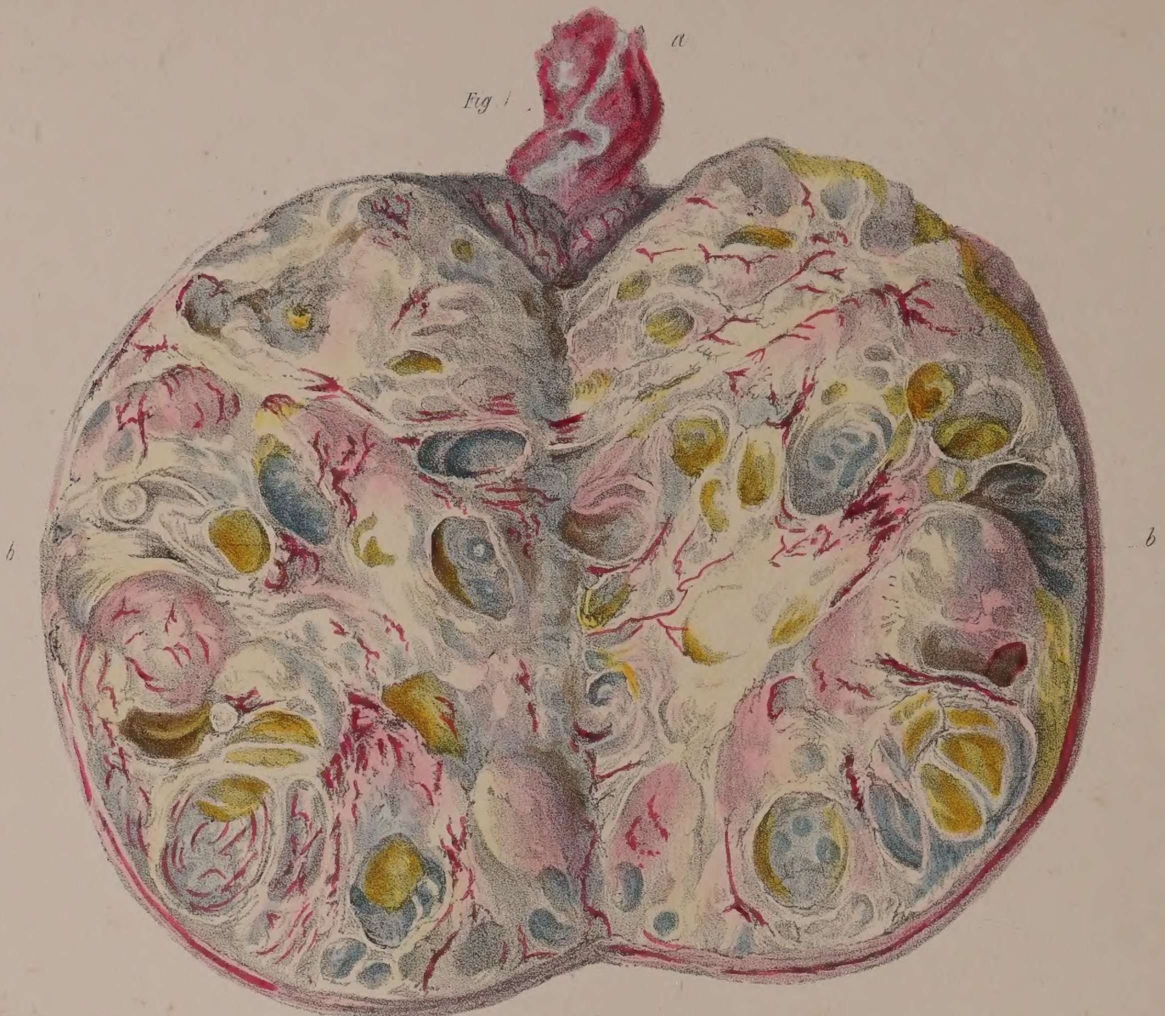

Fig 2.

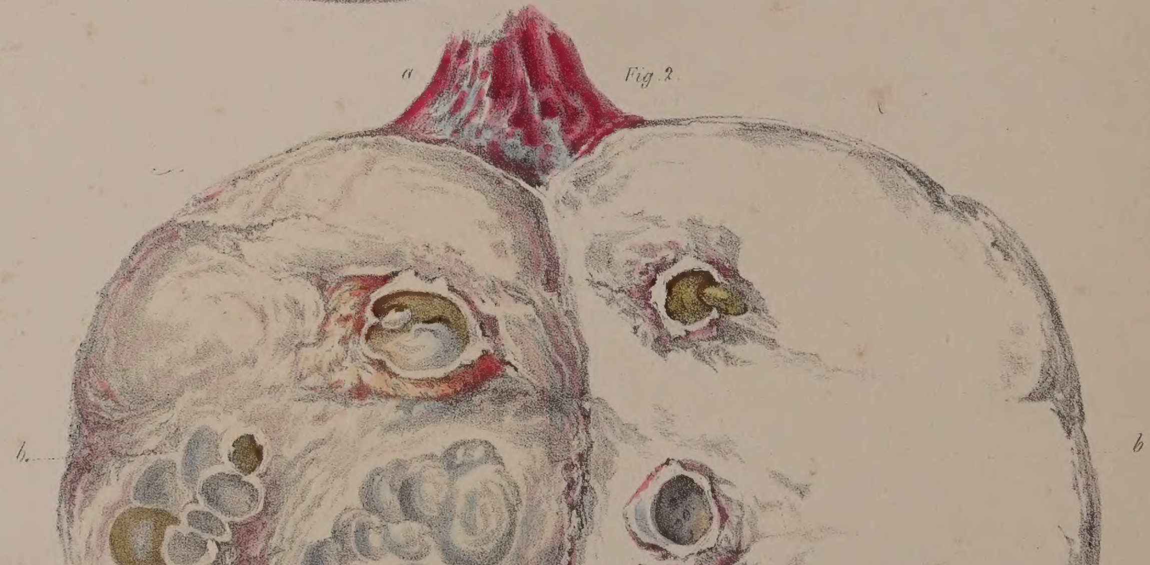

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PLATE III.—PART II.

This is a most excellent drawing of the appearance presented by an hydatid testis immediately after its removal from the living body. It shows its excessive vascularity, and its numerous cysts, containing serum or fibrine, according to the degree of increased action which accompanied the disease. The epididymis is similarly diseased.

a, spermatic cord.

b b, testis and epididymis in one mass.

Fig. 2.—A section of a testis affected with the same disease, but in a less degree.

a, spermatic cord.

b b, testis partially drawn.

c, hydatids.

The upper hydatid on the right side contained mucus, which is in part drawn out.

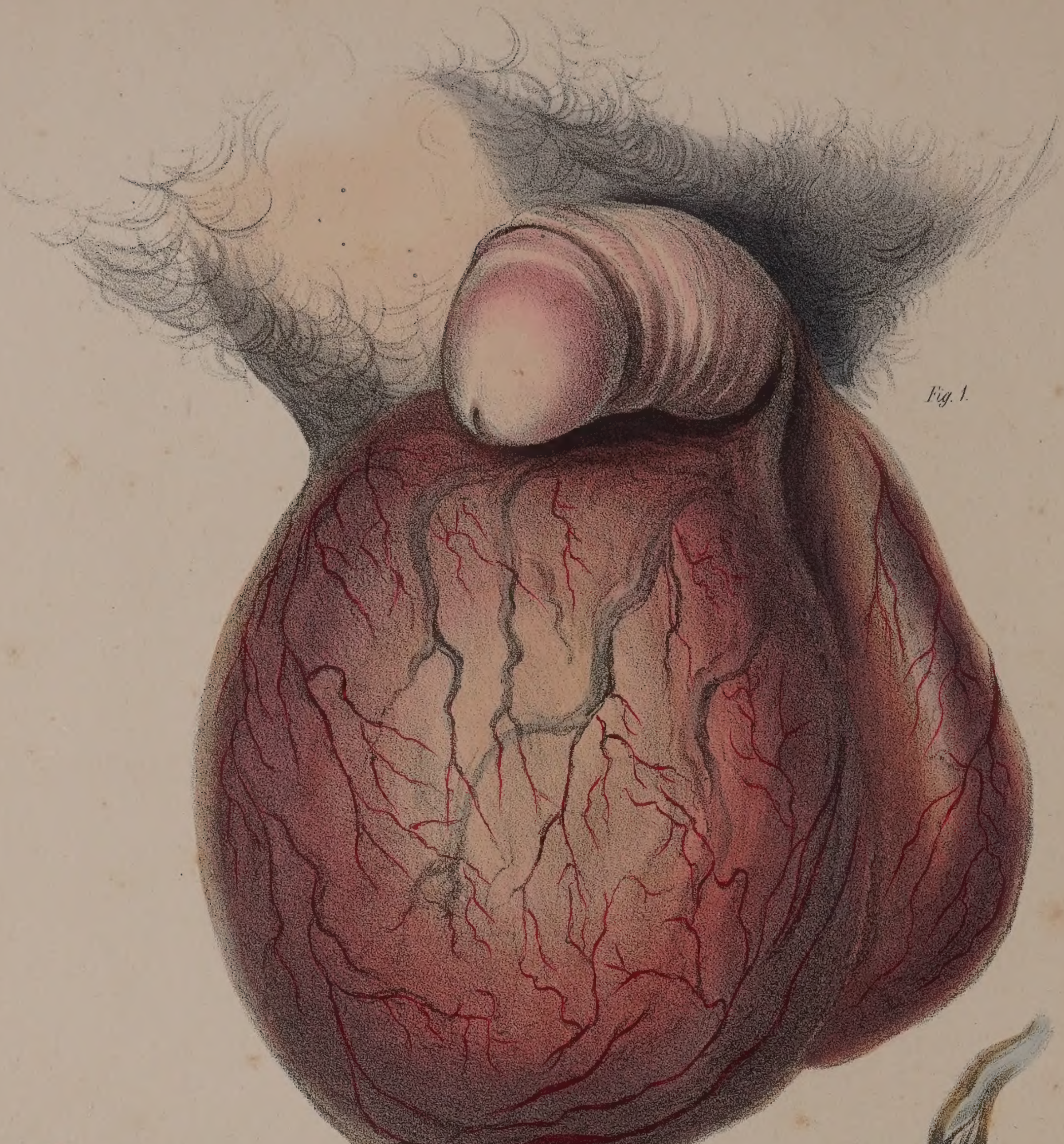

Fig. 1.

Fig. 2.

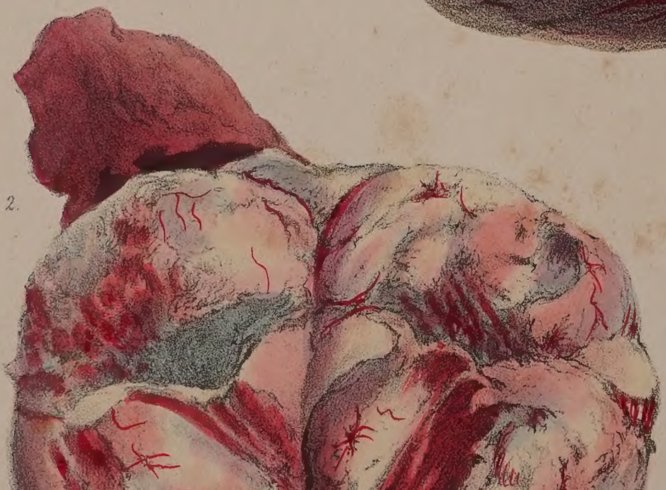

Fig. 3.

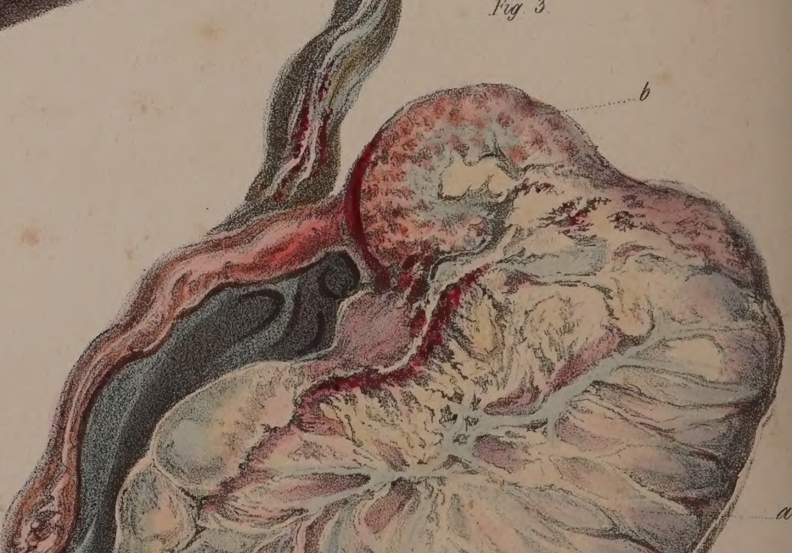

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PLATE IV.—PART II.

VIEWS OF FUNGOID DISEASE OF THE TESTIS.

Fig. 1 shows the high vascularity of the scrotum in the advanced stages of the disease, as well as a degree of retraction of the testis and of the penis.

Fig. 2.—A testis which I removed from a patient of Dr. Blackman, of Ramsbury, Wilts.

The whole of the testis was not diseased; yet the complaint afterwards appeared in the abdomen.

Fig. 3.—Testis from a patient of Mr. Oakes, of Cambridge:—

a, testis.

b, epididymis.

c, spermatic cord.

Fig. 2, *and I believe* 3, *at St. Thomas's Hospital.*

PLATE 5

Fig. 1

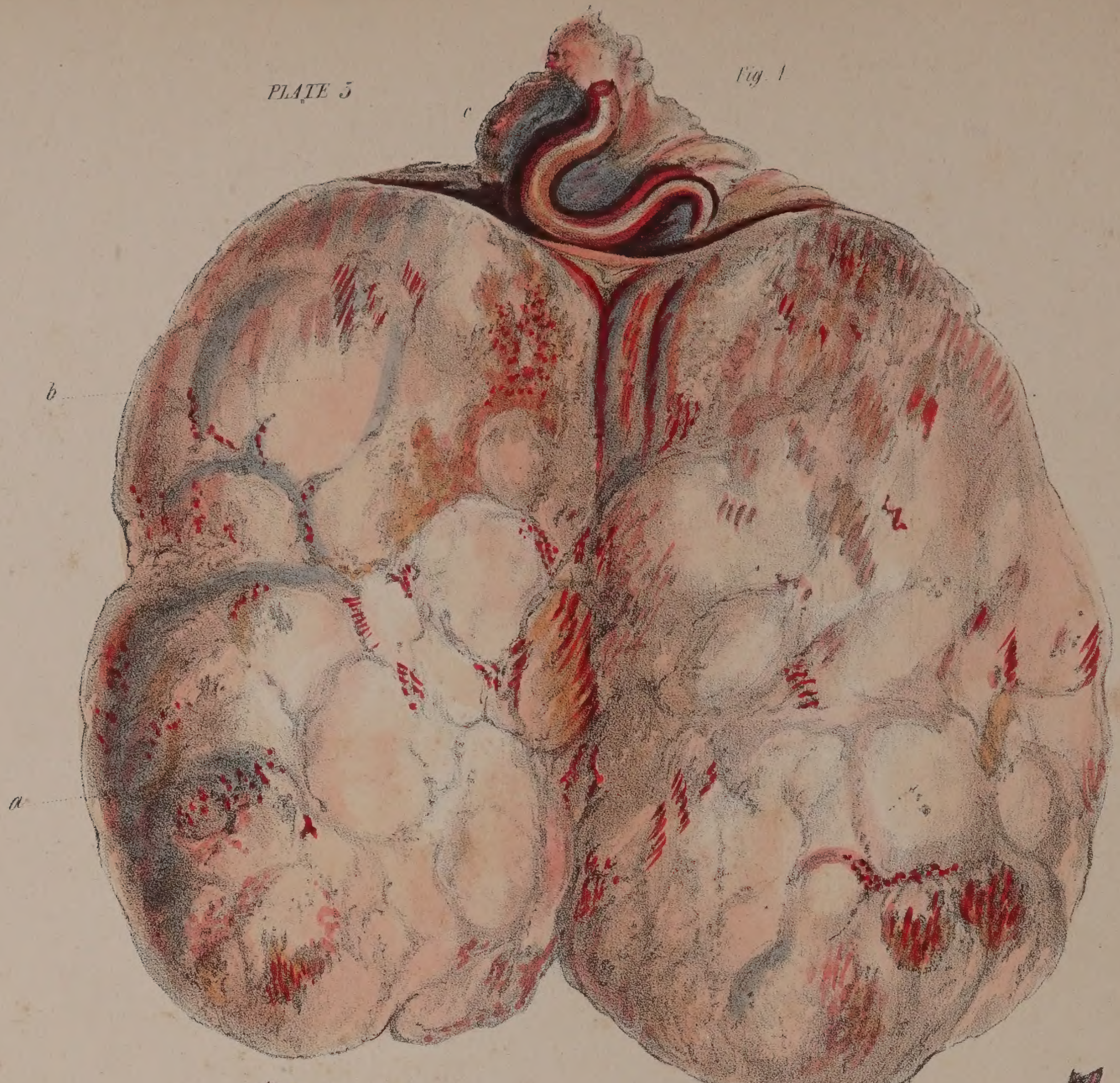


Fig 2

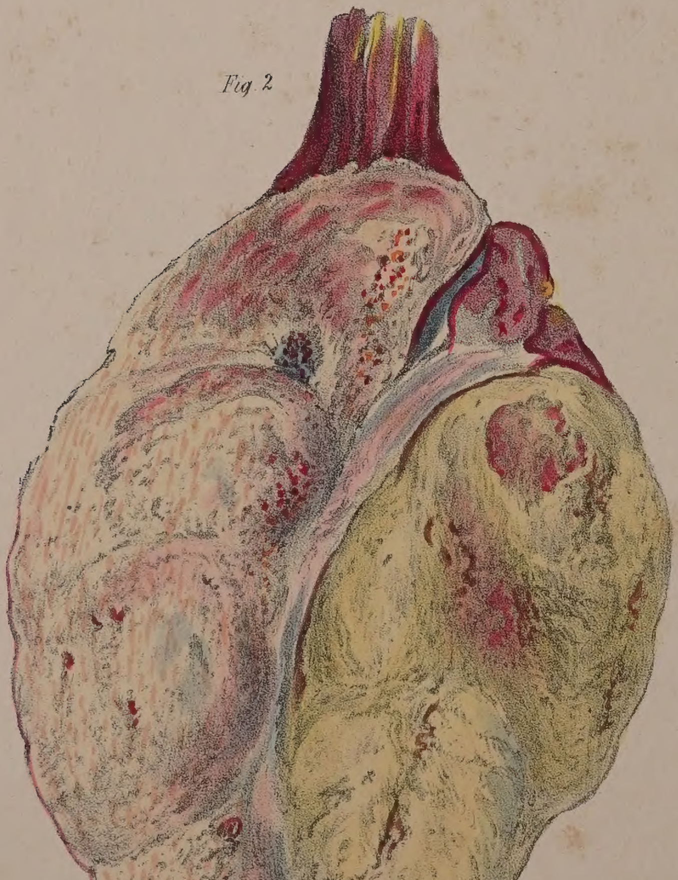
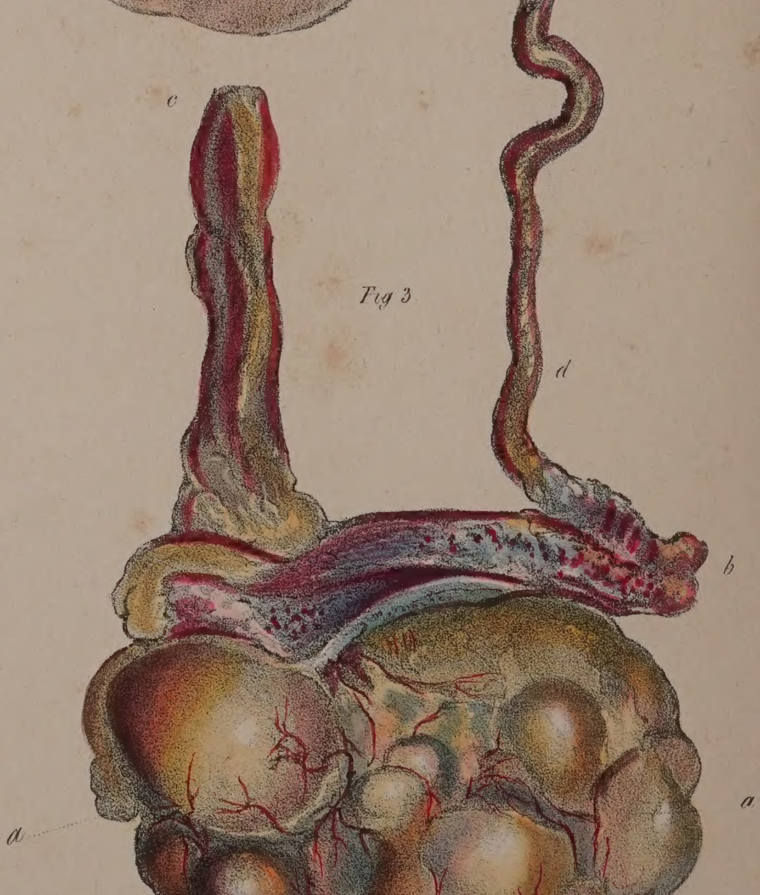


Fig 3



On Stone by Wm Fairland

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PLATE V.—PART II.

Fig. 1.—The appearance of an excellent specimen of Fungoid Disease, which has been injected, and copied soon after its removal. The figure shows the great enlargement of the spermatic artery—the soft fibrine effused in these cases, and admitting the blood-vessels very unequally—the substance easily broken down by the finger—and the epididymis similarly affected.

a, testis.
b, the epididymis.
c, spermatic cord and artery.

Fig. 2.—Testis removed from a Dr. Kilger aged 39, October 25, 1819, for fungoid disease. The disease returned in the abdomen in 1820, and destroyed him. The testis was retracted at the time of the operation. A gush of water followed the incision into the tunica vaginalis. The spermatic cord was a little enlarged. He had pain in the loins before the operation. His countenance was sallow.

Fig. 3.—The external tuberculated surface of a fungoid disease of the testis, exposed by removing the tunica albuginea:

a a, tubuli of the testis in a diseased state.
b, epididymis.
c, spermatic cord.
d, vas deferens enlarged.

Removed March 4, 1818. The result of the case I do not know.

PLATE 6

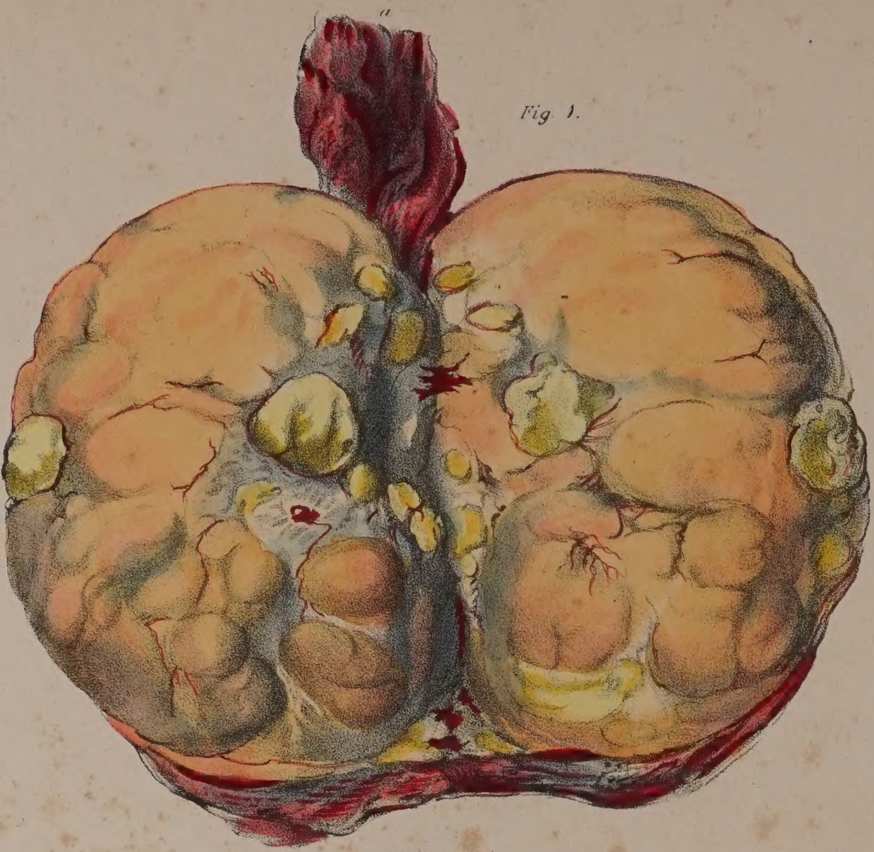

Fig. 1.

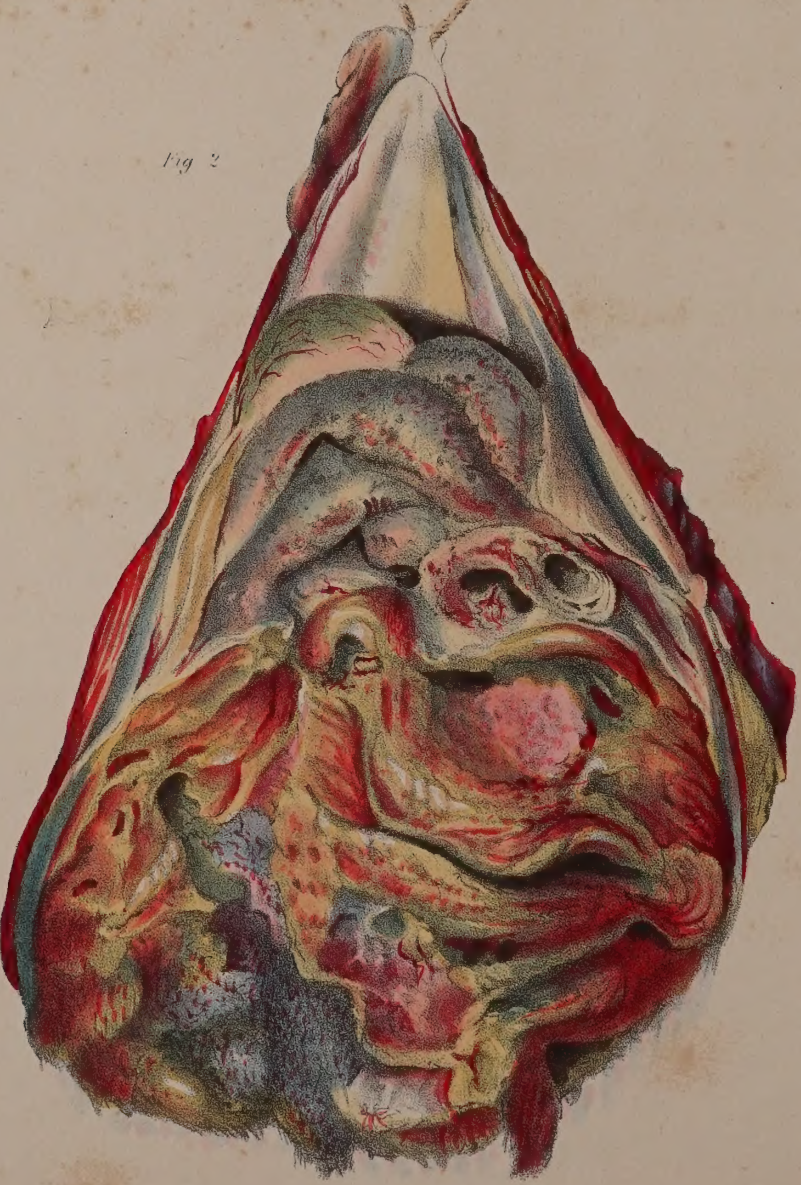

Fig 2

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PLATE VI.—PART II.

Fig. 1.—View of the fungoid testis of James Watson.—See Case, page 206.

a, spermatic cord.

The testis, filled with fungoid secretion, with spots of acute inflammation in parts of it.—See Plate VIII.

Fig. 2 shows the testis of Mr. A., of Worcester. In this Case, besides the soft fungoid effusion, a peel of adhesive matter (fibrine) could be separated from the divided surface; showing the presence also of acute inflammation.—See also Plate IX.

PLATE 7

Fig. 2.

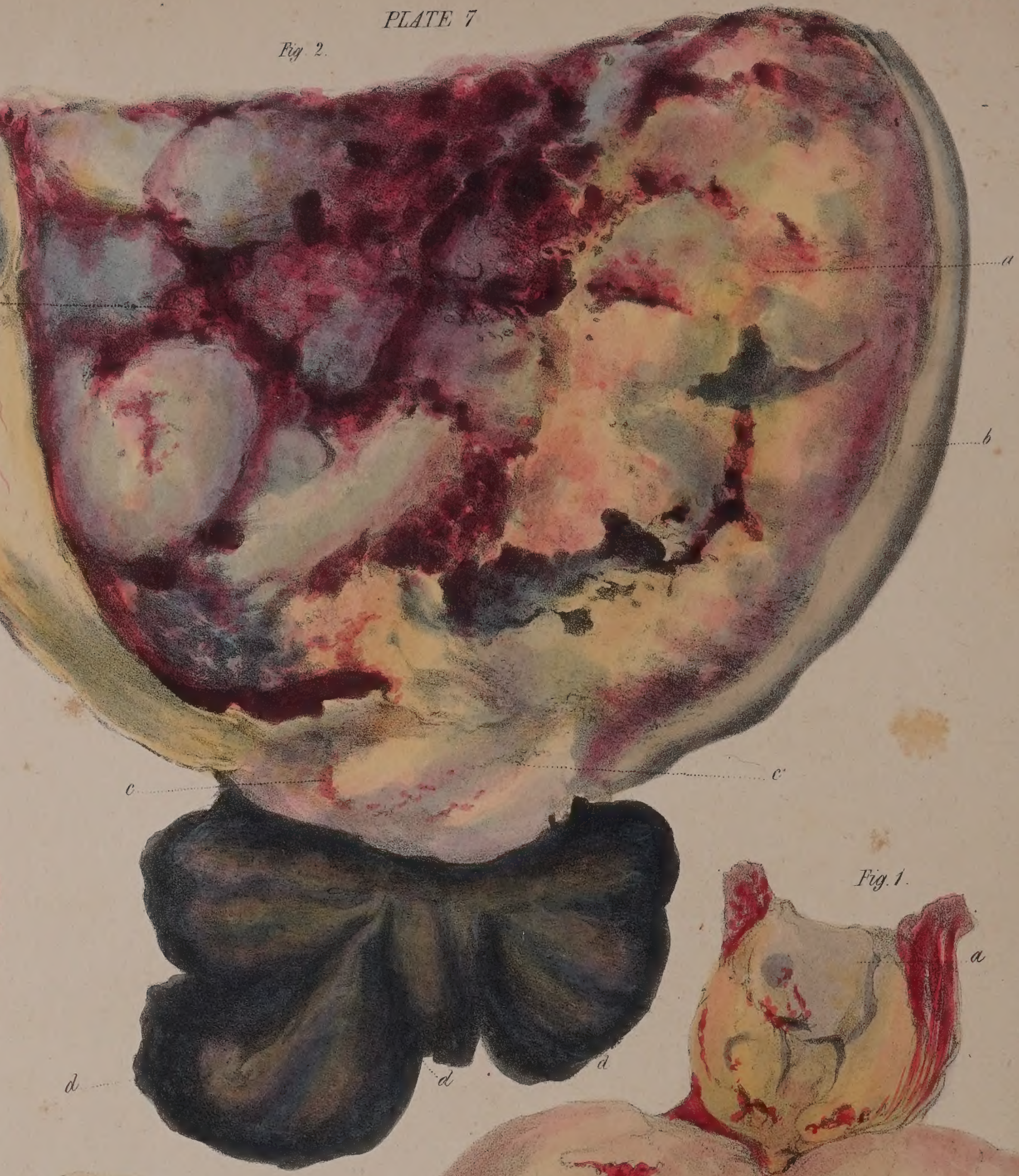
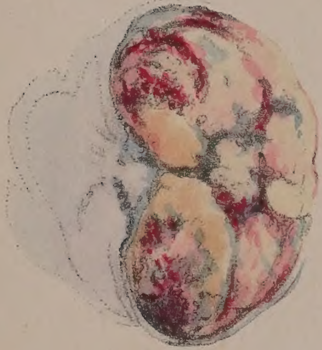


Fig 3.



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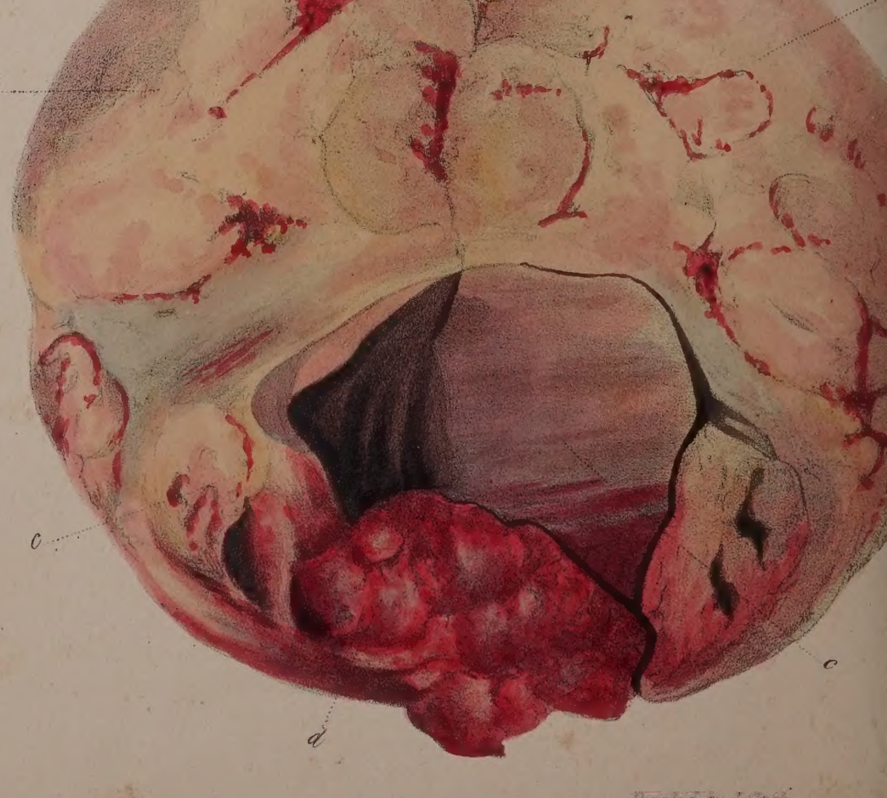

Fig 4

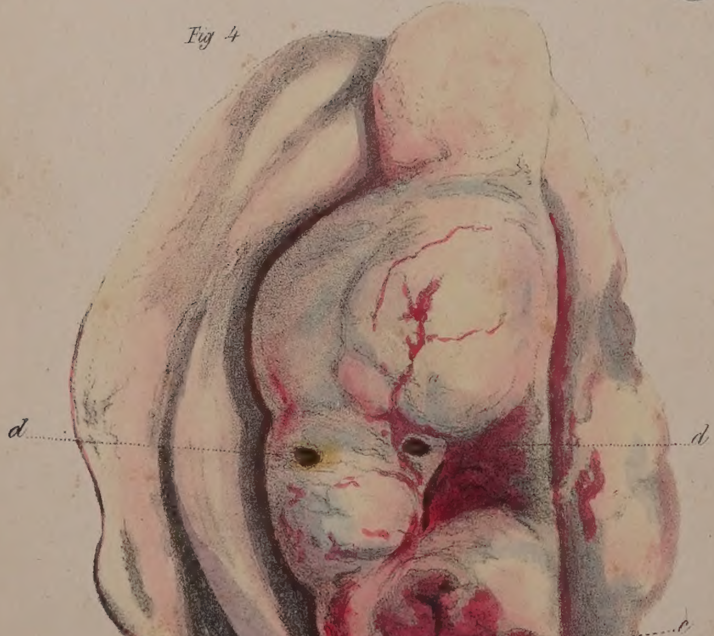

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PLATE VII.—PART II.

VIEWS OF THE MORE ADVANCED STAGES OF FUNGUS.

Fig. 1 shows a fungoid testis removed from a Mr. B., in which a cyst is seen, containing bloody serum, and from the interior of which grew a fungoid excrescence. The testis, epididymis, and spermatic cord were diseased:—

a, diseased spermatic cord.
b b, testis and epididymis.
c c, cyst.
d, fungous growth from the interior of the cyst.

Fig. 2.—Fungoid testis:—

a a, testis diseased.
b b, scrotum, tunica vaginalis, and albuginea in a diseased state.
c c, large ulcerated opening of the tunica albuginea.
d d d, fungoid excrescence projecting through the scrotum.

Fig. 3.—Gland in the groin enlarged, and diseased from the irritation of the ulcerated scrotum.

Fig. 4 shows the progress of fungoid disease:—

a, testis filled with a fungous secretion.
b, tunica vaginalis.
c, bloody fungus, from the bursting of vessels, and from extravasation.
d d, some cysts, which generally contain a fungous growth.

The gentleman from whom this testis was removed, was a Surgeon in Tabernacle Square, London, and afterwards in Whitechapel. He died from the return of the disease.

PLATE 8

Fig 2.

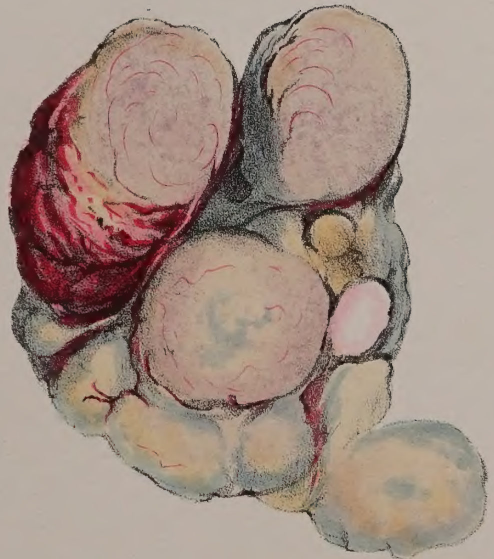
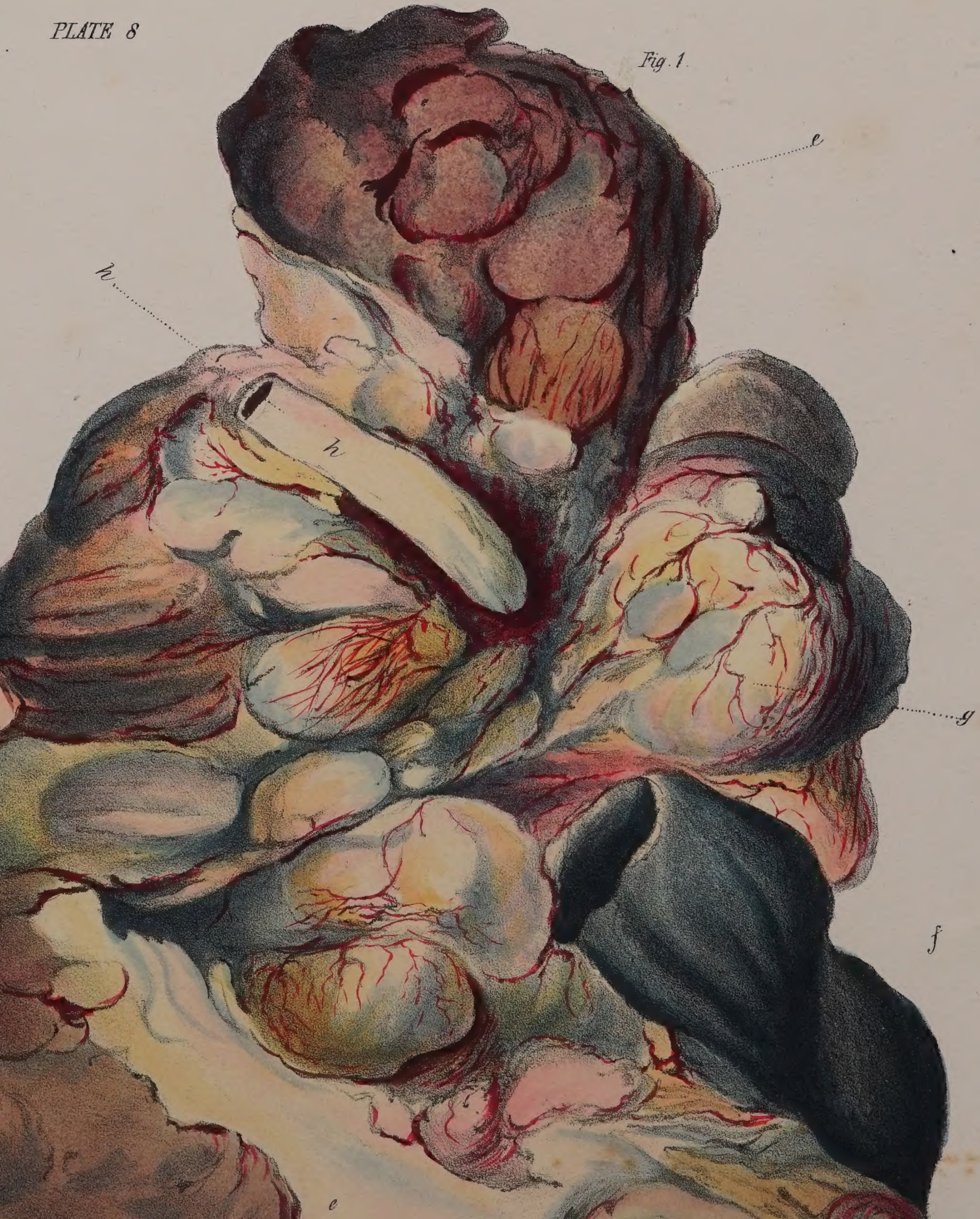
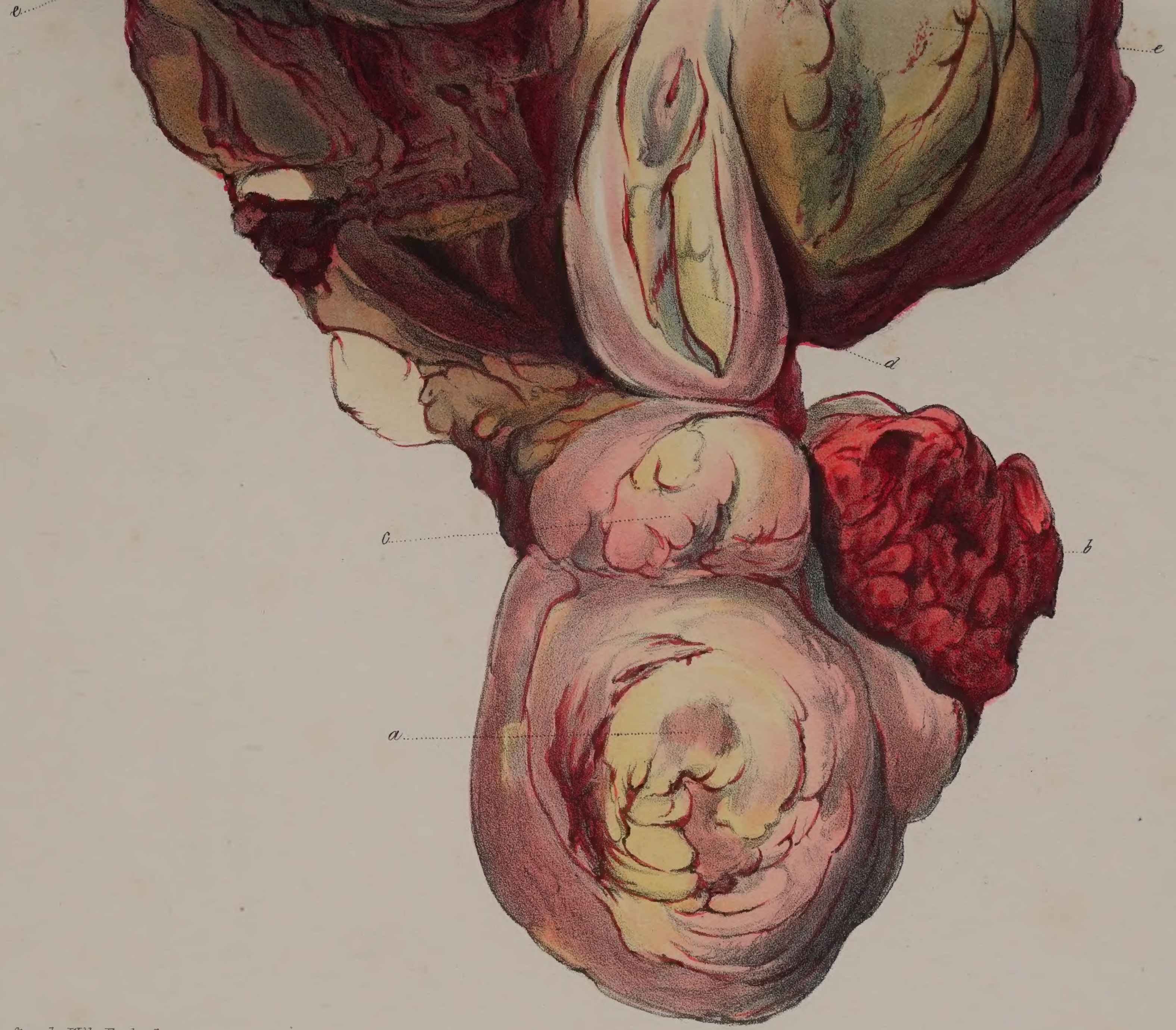


Fig. 1.





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J. Graf, Printer to her Majesty.

PLATE VIII.—PART II.

Exhibits the extension of the disease in Watson, who suffered castration.—See page 206.

Fig. 1.—*a*, end of the divided spermatic cord, forming a considerable tumour.

b, tumour growing into the groin.

c, spermatic cord continued.

d, site of the abdominal ring.

e e e e, tumour in the abdomen.

f, the sigmoid flexure of the colon.

g, portion of the kidney.

h, the ureter.

Fig. 2 shows the diseased deposit, in its attempt at suppuration, assuming the appearance of cerebriform substance, or that of cream mixed with blood.

PLATE 9

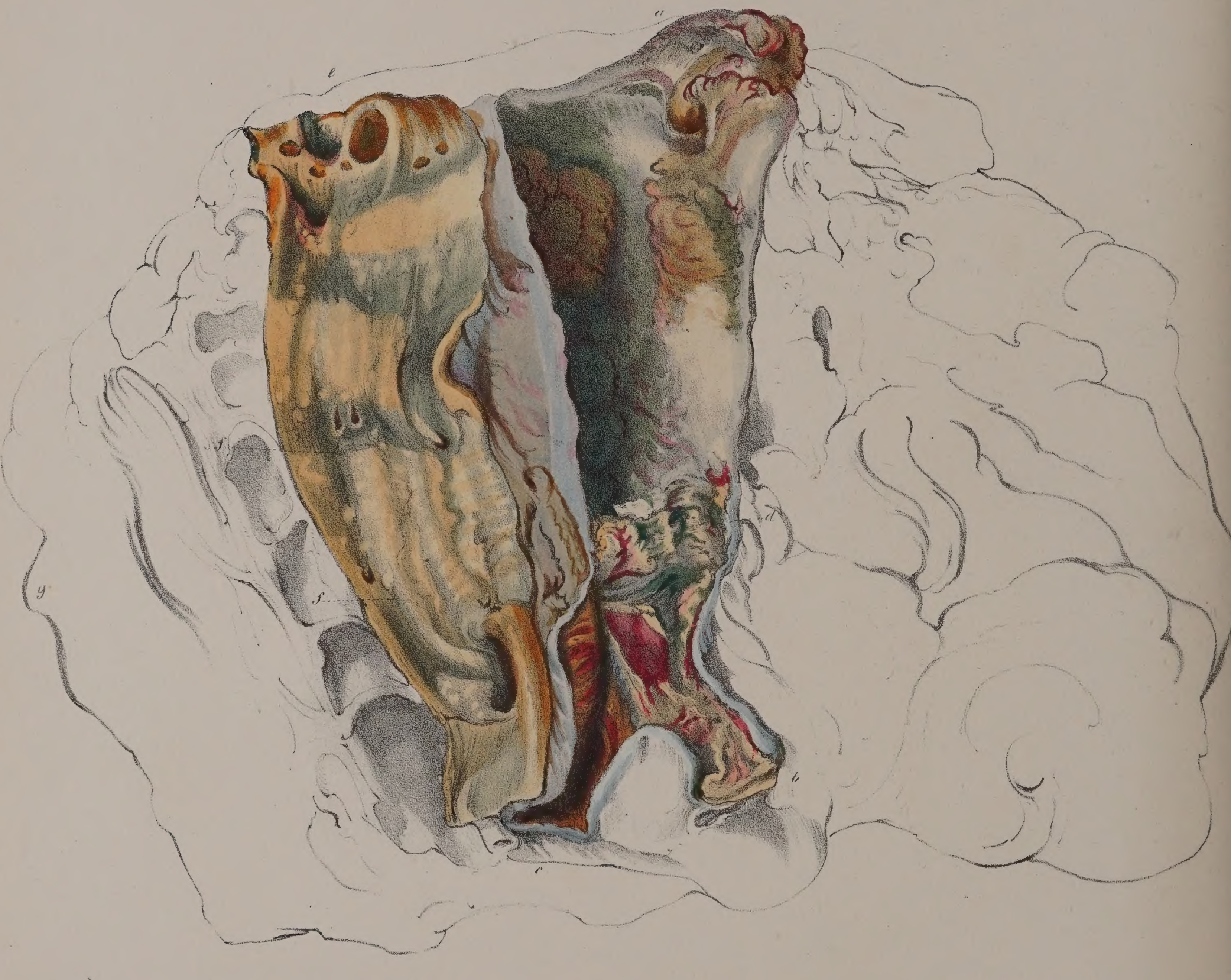

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PLATE IX.—PART II.

Shows the effect of a fungoid testis upon the aorta and vena cava of Mr. A., of Worcester.—Posterior view.

a, vena cava filled with a fungoid secretion at its bifurcation, by which it, as well as the iliac veins, were obliterated.

b, right iliac vein.

c, left iliac vein.

d, the largest quantity of fungoid secretion.

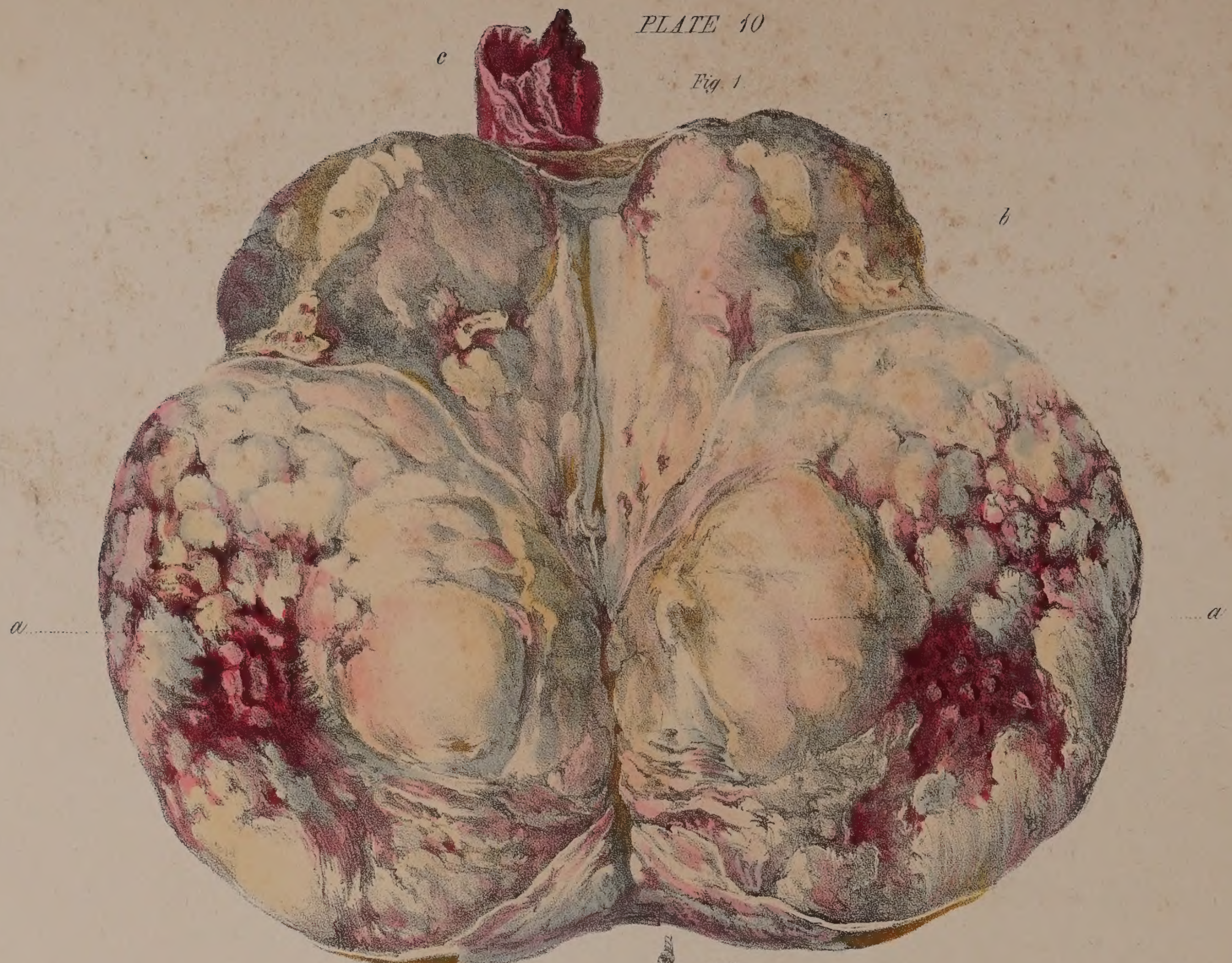
e, aorta opened posteriorly.

f f, several spots of disease in the aorta.

g g, outline of an immense tumour resting upon the spine.

PLATE 10

Fig. 1



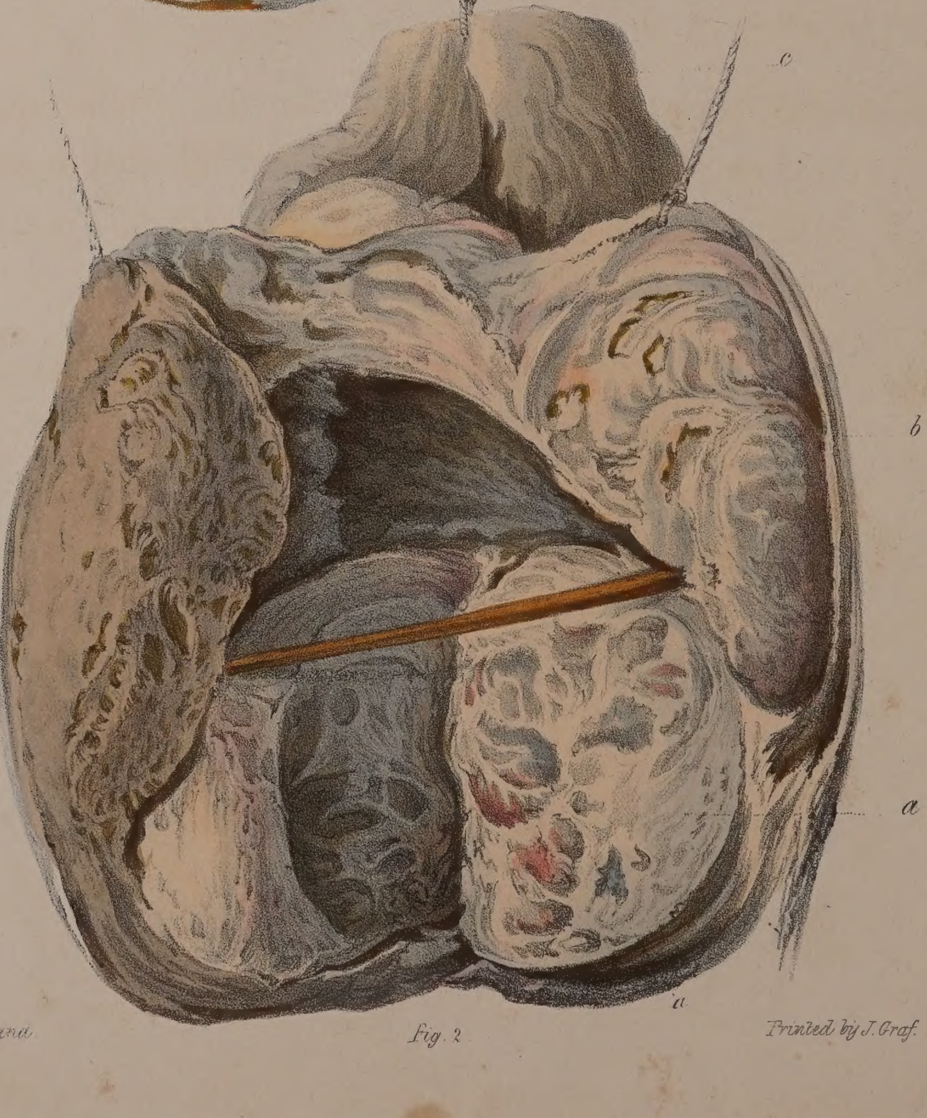


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Fig. 2

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PLATE X.—PART II.

Views of supposed Scirrhous Disease.

Fig. 1.—*a a*, testis cut open; a substance very hard and tuberculated, and very unequally vascular.

b, epididymis, similarly hardened.

c, spermatic cord.

Fig. 2.—Is the copy of a preparation in the Collection at St. Thomas's Hospital before my time. I know nothing of its history. It is excessively hard—in some parts cartilaginous, in others ossific.

a a, testis, with large spots of cartilage, and some bone.

b, epididymis enlarged and hardened.

c, spermatic cord enlarged.

PLATE 11.

Fig. 1.

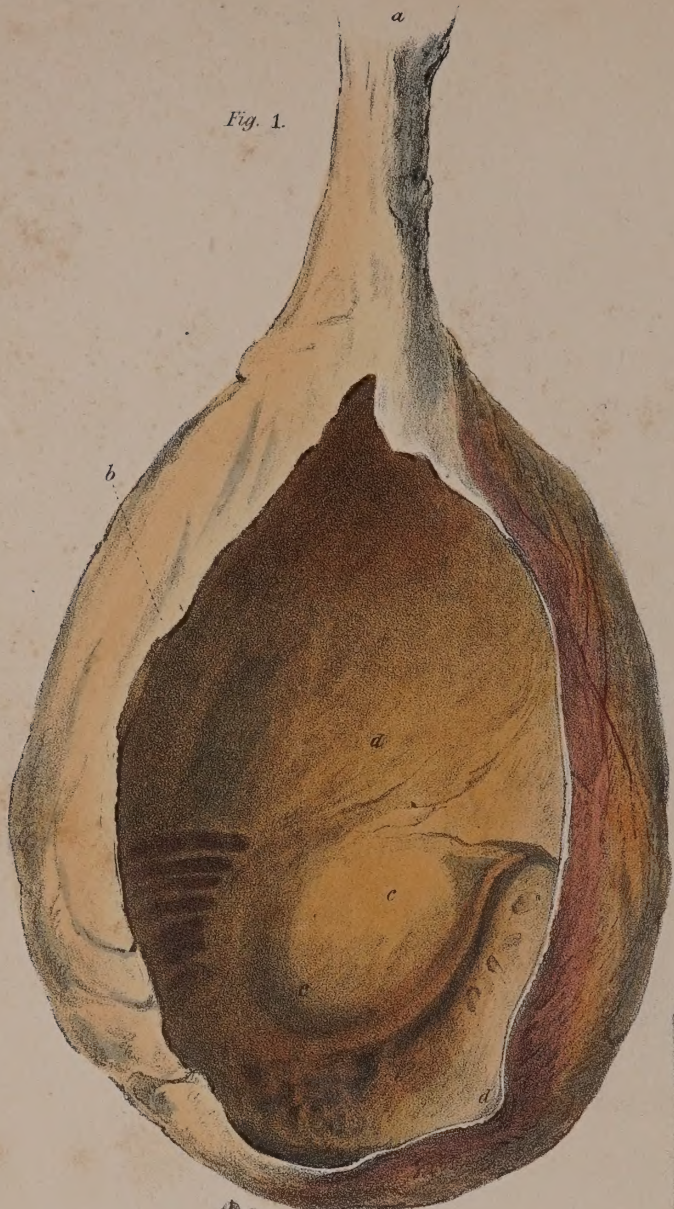

Fig. 3.

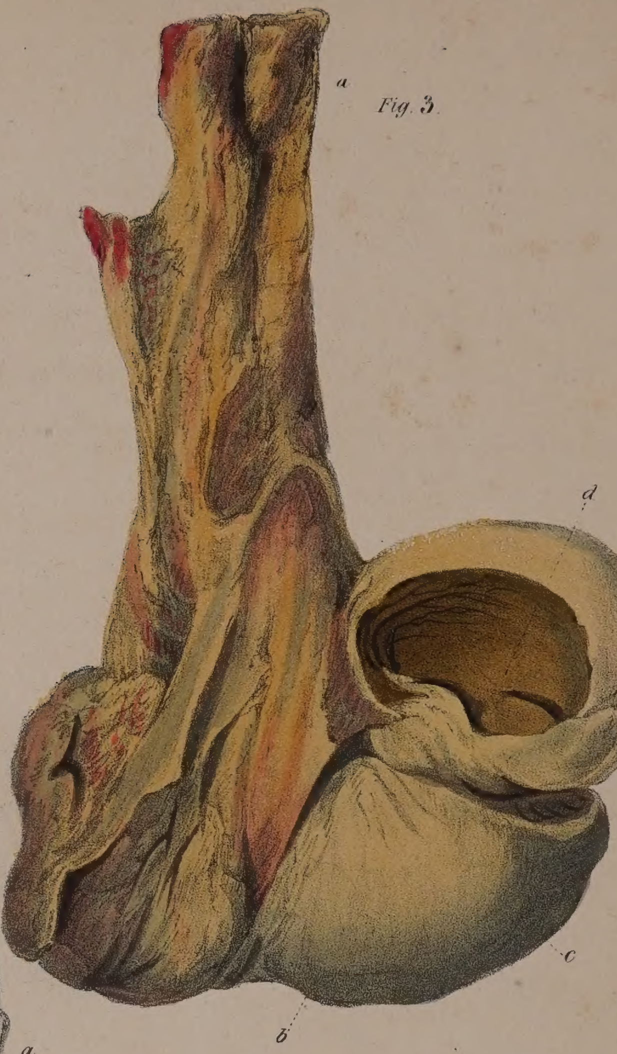

Fig. 4.

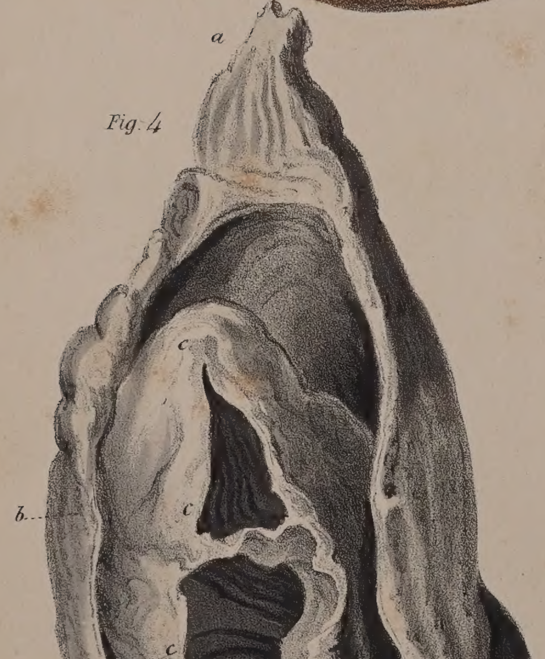

Fig. 5.

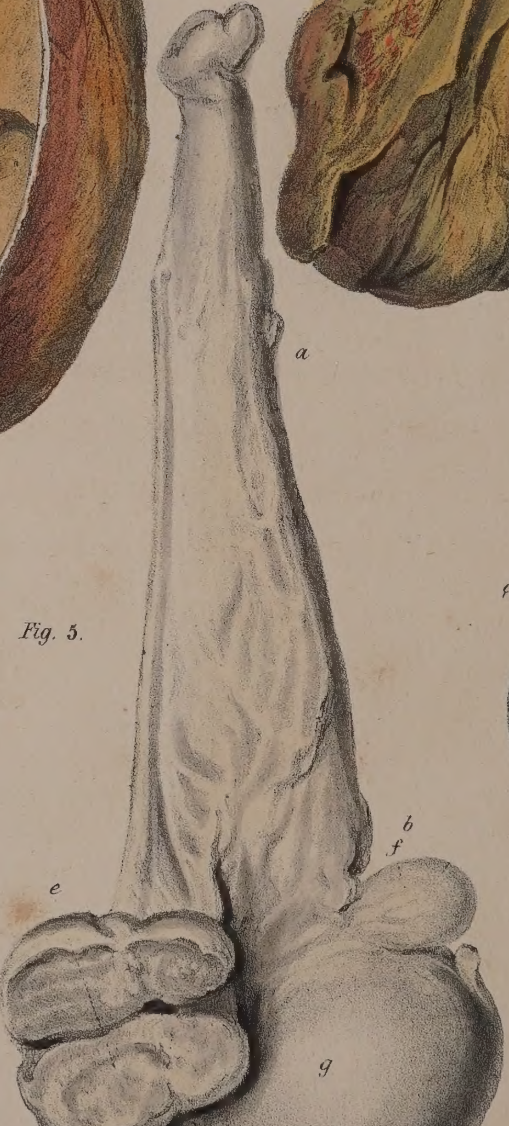

Fig 2.

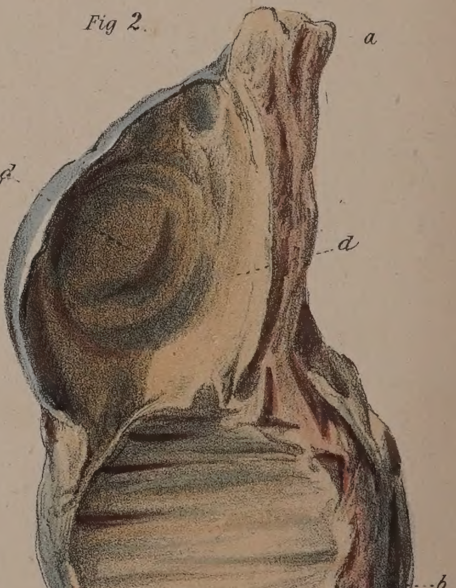

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PLATE XI.—PART II.

DIFFERENT VIEWS OF HYDROCELE.

Fig. 1.—The common hydrocele of the tunica vaginalis :—

a, spermatic cord.
b, tunica vaginalis reflexa.
c c, testis covered by the tunica vaginalis testis.
d d, cavity in which the serum is contained.

Fig. 2.—Hydrocele with adhesion of the tunica vaginalis :—

a, spermatic cord.
b, testis.
c, tunica vaginalis adhering to the surface of the testis.
d d, partial hydrocele at the place at which the tunica vaginalis did not adhere, so that the hydrocele was situated above the testis. According to the site of the adhesion, is the water found above, below, or on the side of the testis.

Fig. 3.—Serous cyst at the caput epididymis.

a, spermatic cord.
b, cauda epididymis.
c, testis.
d, hydrocele, cyst in the caput epididymis.

Fig. 4.—Cyst growing from the testis, situated between the tunica vaginalis and tunica albuginea, and projecting into the cavity of the tunica vaginalis reflexa.

a, spermatic cord.
b b, tunica vaginalis reflexa.
c c c, cysts, divided into different cavities.
d, testis.

Fig. 5.—Testis of Dr. Monsey, given to the Collection at St. Thomas's Hospital by Mr. Thompson Forster, and supposed to have a small imperfect testis adhering to it:—

a, spermatic cord.
b, epididymis.
c, body of the testis.
d, vas deferens.
e, supposed third testis.
f, epididymis.
g, testis.

This was probably only a chronic tumour of the cord; but the Doctor had the appearance of having three testes.

Fig. 3.

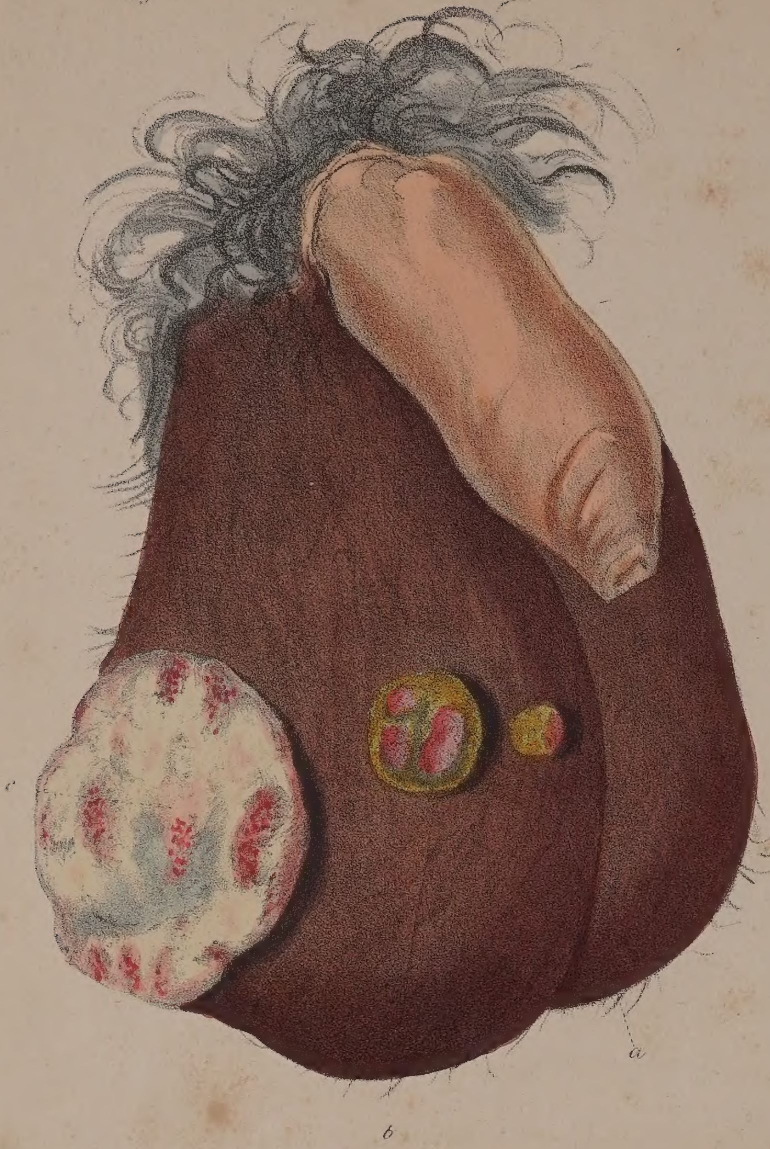

Fig. 2.

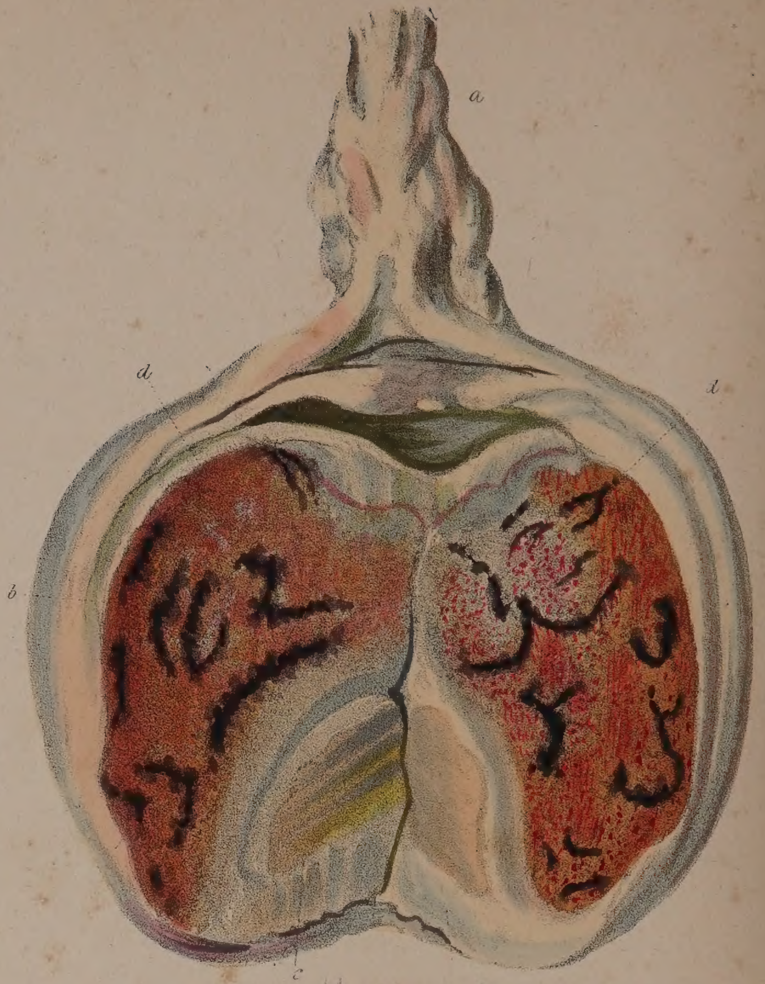

Fig 4.

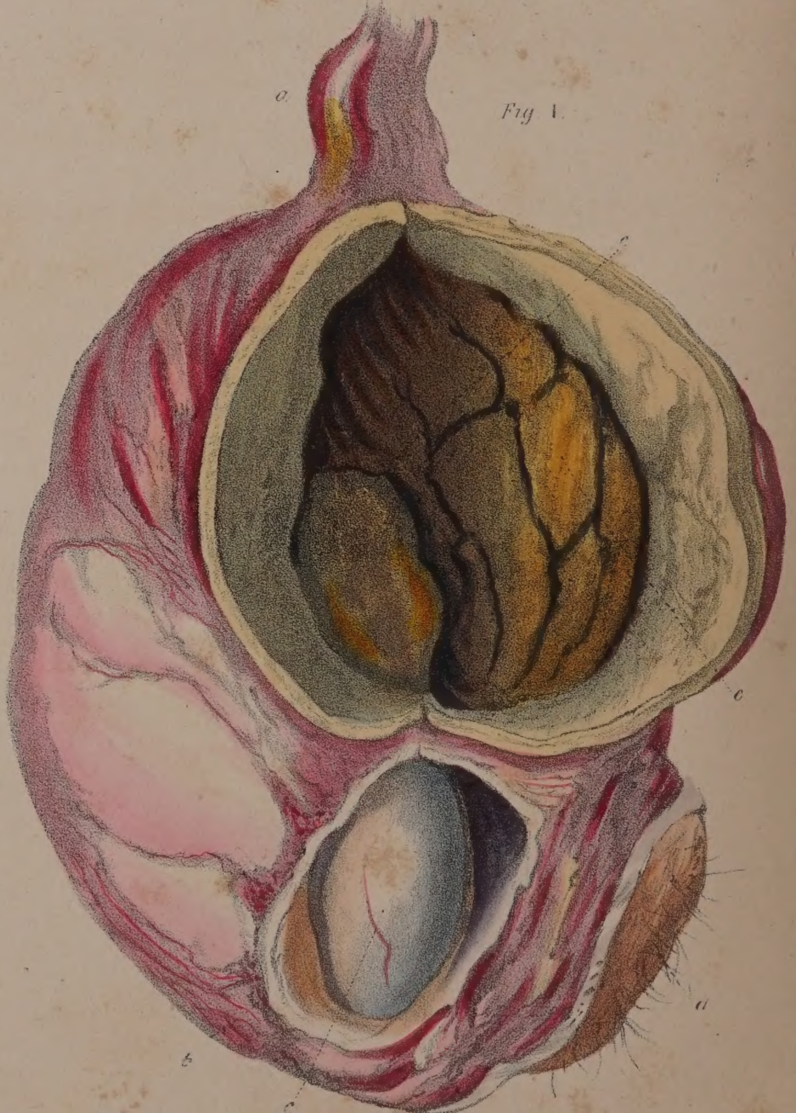

Fig 1.

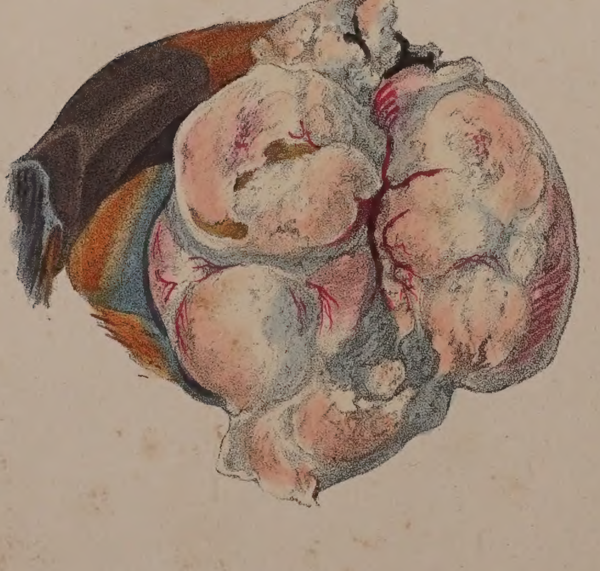

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PLATE XII.—PART II.

Fig. 1.—Hydrocele of the spermatic cord:—

a, spermatic cord.
b, tunica vaginalis.
c, testis.
d, scrotum.
e e, cyst on the spermatic cord, the coats of which possess great thickness.

Fig. 2.—Hæmatocele of long standing:—

a, spermatic cord.
b, testis.
c, tunica vaginalis excessively thickened.
d d, coagulated blood in the tunica vaginalis.

Fig. 3.—Chimney Sweeper's cancer, showing on the same scrotum, its incipient, its more advanced, and its ulcerated stages.

a, small wart.
b, encrusted wart.
c, ulcer with everted edges.

Fig. 4.—Diseased absorbent glands in the groin from Chimney Sweeper's cancer, showing an effusion organized in some parts, and unorganized in others.

PLATE 13.

Fig. 2.

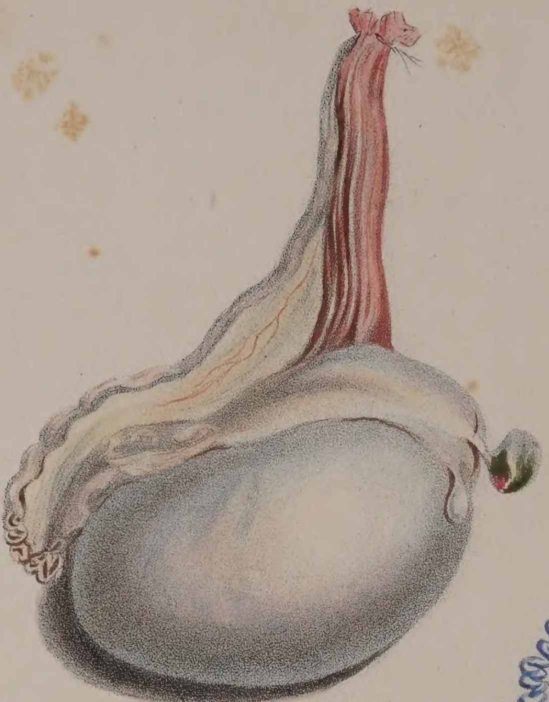

Fig. 3.

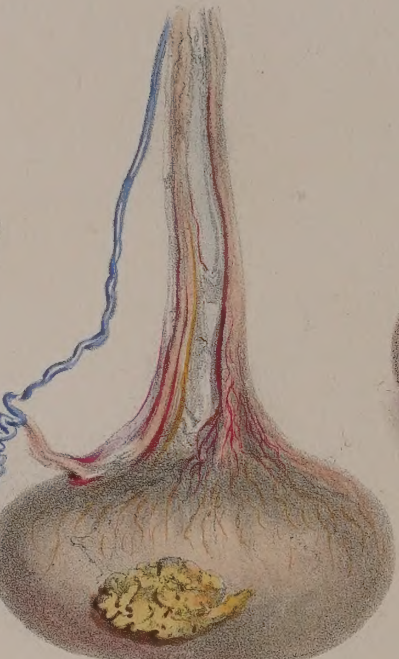

Fig. 1.

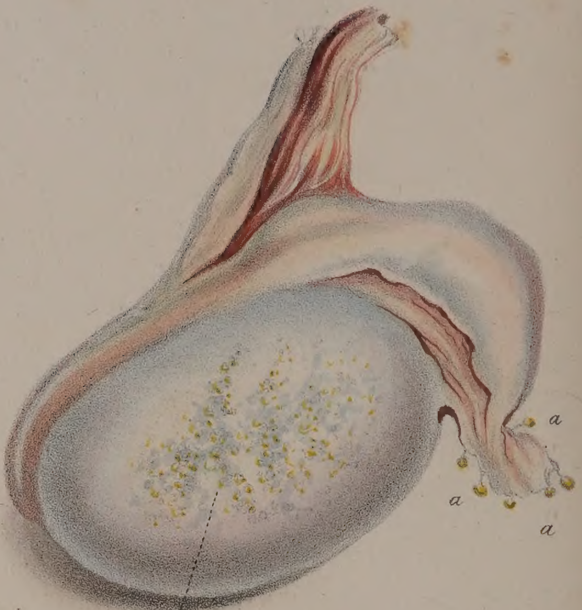

Fig. 4.

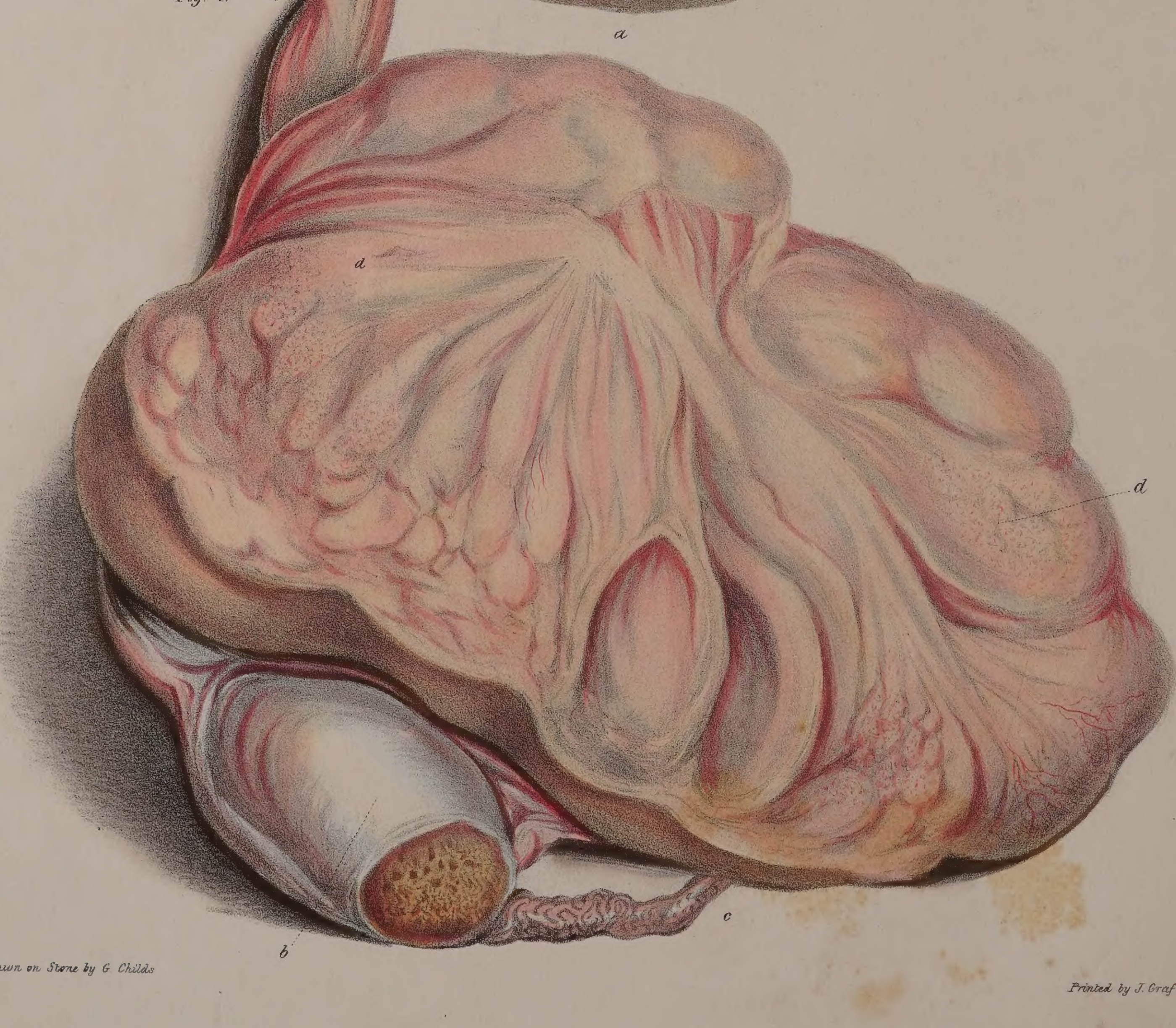

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PLATE XIII.—PART II.

Fig. 1.—*a a a*, Cartilaginous bodies growing from the caput epididymis.

b, cartilaginous and ossific bodies between the tunica vaginalis and tunica albuginea.

Fig. 2.—A cartilaginous body hanging from the caput epididymis by its pedicle.

Fig. 3.—*a*, ossific body growing between the tunica vaginalis and tunica albuginea.

Fig. 4.—Testis and tumour removed by Sir B. Brodie :—

a, spermatic cord.

b, testis in a healthy state.

c, vas deferens injected.

d d, tumour in the tunica vaginalis, composed of numerous lobes, which show the incipient state of what I believe would become fungoid disease.

In this tumour a considerable portion of ossific matter was deposited. In Sir B. Brodie's Collection.—(See Analysis).

PLATE 14

Fig. 4.

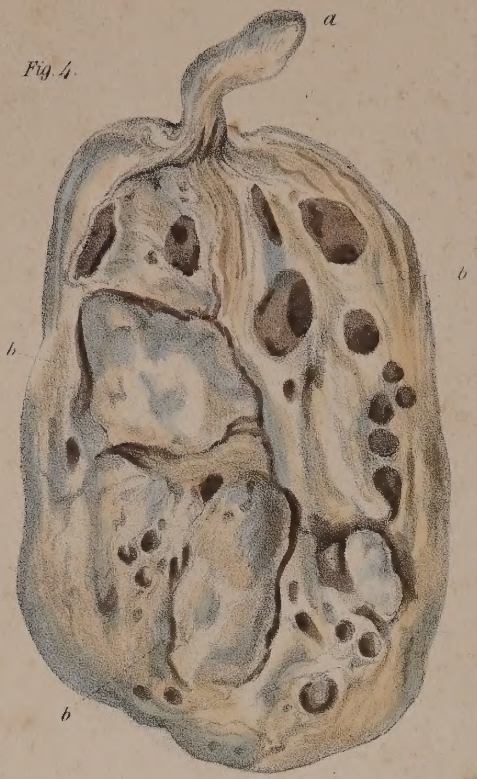

Fig. 5

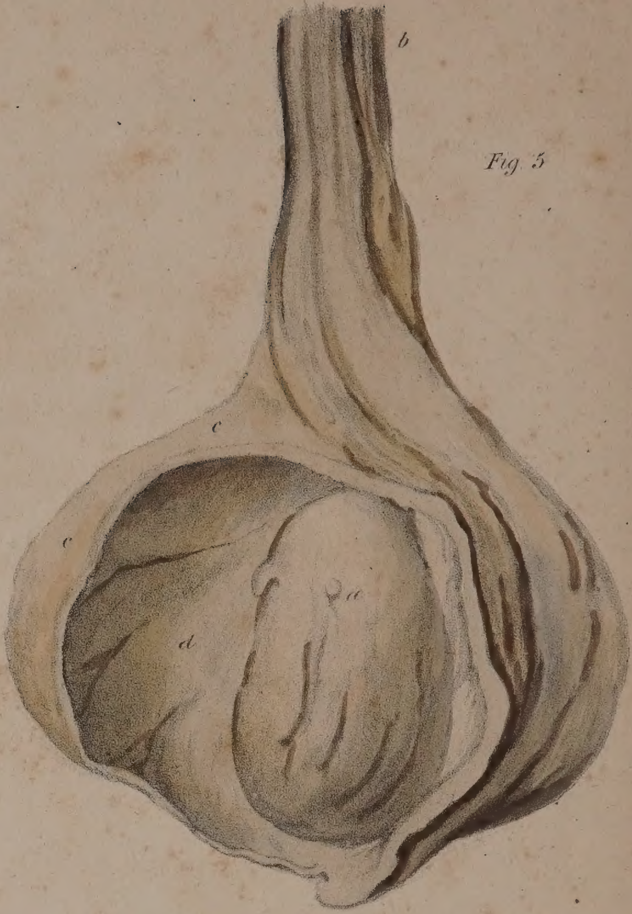

Fig. 3.

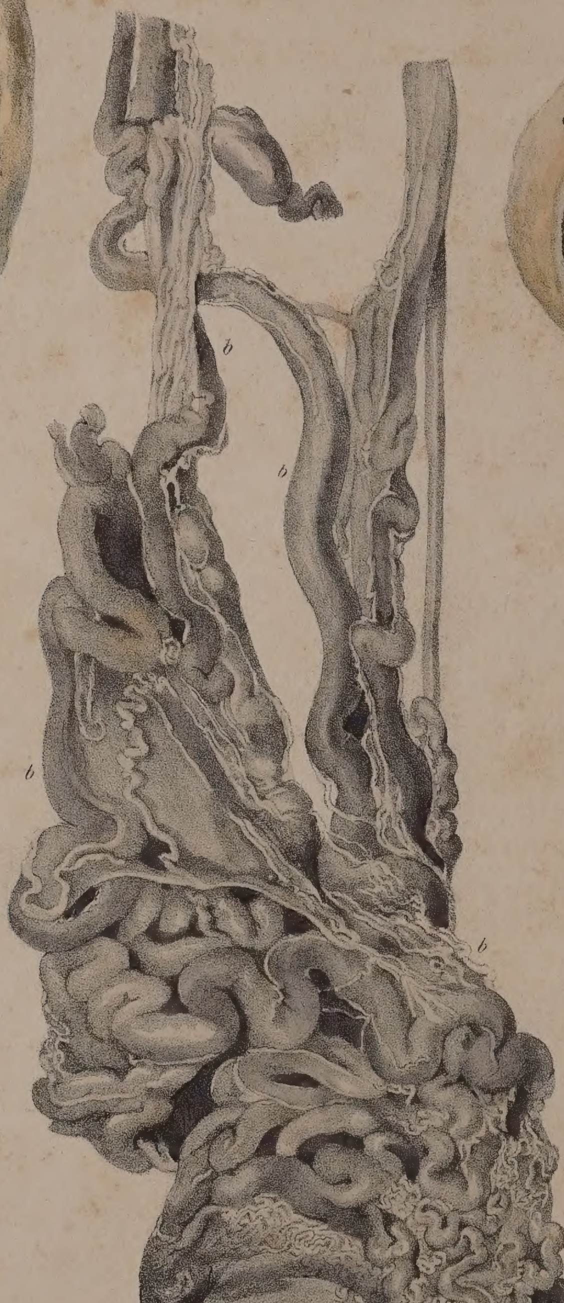

Fig. 1

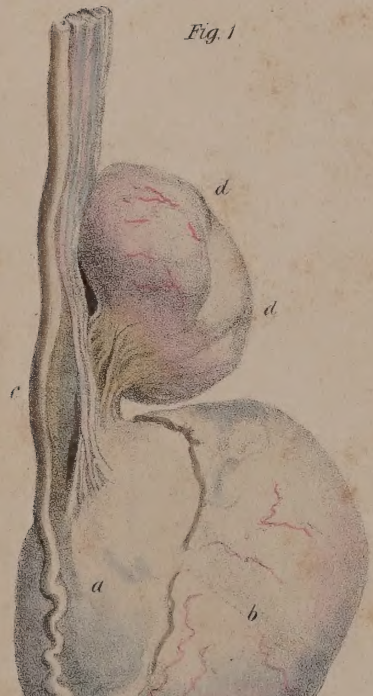

Fig. 2

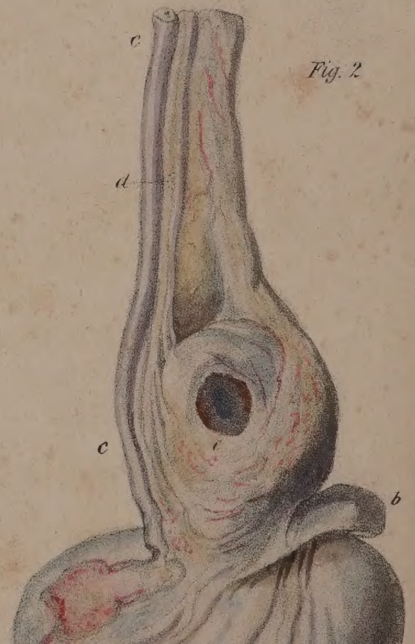

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PLATE XIV.—PART II.

Views of hydrocele of the spermatic cord; of a varicocele; of an hydatid or tubular testis; and of a tunica vaginalis after the injection of a hydrocele.—(See Case.)

Fig. 1.—Hydrocele of the spermatic cord:—

a, testis.
b, tunica vaginalis, showing where it ceases to cover the testis.
c, vas deferens.
d d, hydrocele cyst adhering to the spermatic cord.

Fig. 2.—Another hydrocele of the cord:—

a, testis.
b, epididymis.
c c, vas deferens.
d, ligaments of the vas deferens.
e, cyst of the hydrocele involved in the cord.

Fig. 3.—A varicocele:—

a, testis.
b b b b, spermatic veins enlarged.

This view is taken from a preparation in the Museum at St. Thomas's Hospital, which was in the Collection before I went to the Hospital in the year 1784.

PLATE XIV. CONTINUED.

Fig. 4.—A dissection of an hydated testis, which appears to me to show that this disease is an altered secretion into the tubes and bags formed by obstructions of the tubuli seminiferi, at least that it is so in some instances. This view seems to explain why this disease does not extend beyond the testis and epididymis.

a, spermatic cord.
b b b, numerous bags of fluid.

Fig. 5.—Hydrocele cured by injection, in which there was only partial adhesion. The disease did not return.

a, testis.
b, spermatic cord.
c c, tunica vaginalis.
d, interior of the tunica vaginalis, which has lost its smooth and polished secreting surface.—(See Case).

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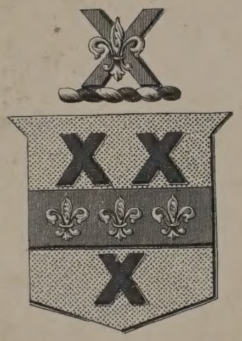

E. BARCLAY-SMITH, M.D.